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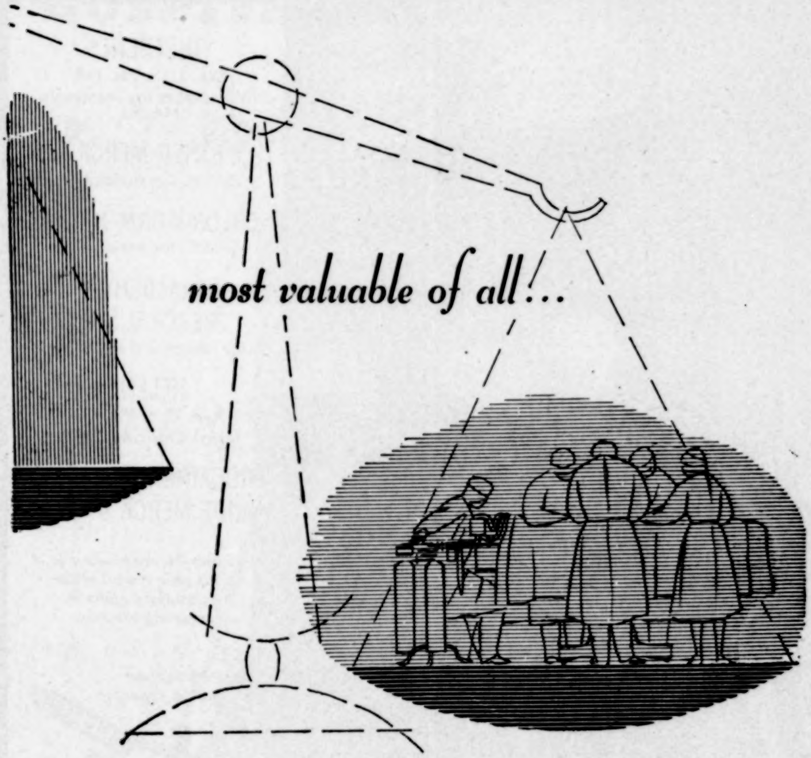
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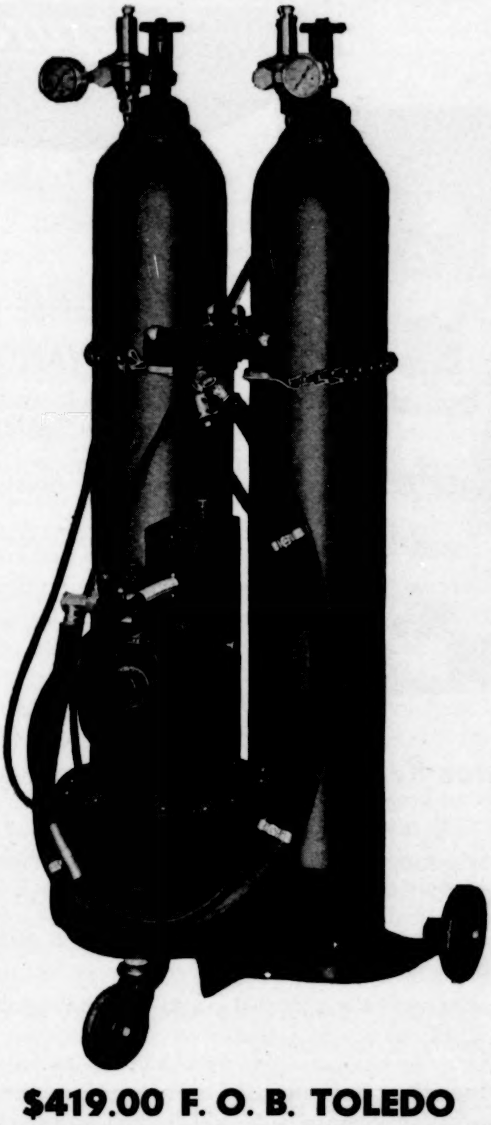

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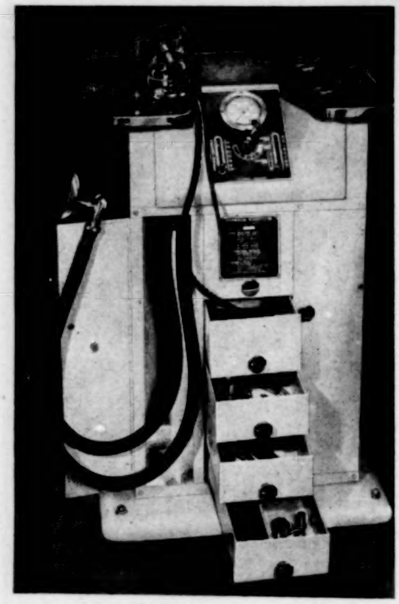

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The Journal of the American Association
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VOLUME XV AUGUST, 1947 NUMBER THREE

The Answer Is "Yes"

To the Editor:—The editorial that appeared in the May JOURNAL asks: "Is the Situation Serious?" I would say "Yes": serious because of the acute shortage of anesthetists despite the return of most of our members and the medical anesthetists who were in the service to their civilian posts, despite the increased number of practicing medical anesthetists trained in the Army or in the expanding civilian training program, and despite the undiminished number of nurse anesthetists entering the field. The total number of anesthetists in all these groups, plus those individuals unaccounted for in any society of anesthetists—the interns, the nurses, and the general practitioners—is not meeting present day requirements for anesthetists.

Letters, telegrams, and long distance calls come in almost daily to our department office requesting nurse anesthetists—requests that we cannot fill. This same situation exists in other hospitals conducting training programs in anesthesia for nurses, and, I understand, many requests are also received at the Association Executive Office. These requests, some of them urgent pleas, are not only from hospital administrators, surgeons, dentists, and nurse anesthetists, but from medical anesthetists as well.

What is the reason for this shortage of nurse anesthetists? In all other branches of nursing, the two basic reasons given for the shortage of nurses are the decreased number of entrants to the schools of nursing and the need for more nurses in the expanding public health program. Since to date there has been no decrease in the number of professional registered nurses taking training in, and entering the specialty of, anesthesia, this cannot be a reason for the shortage of nurse anesthetists. Unquestionably, this shortage has been created by the increased need and demand for the services of the nurse anesthetist.

What has caused the increased demand for the services of the nurse anesthetist? The Veterans Administration is employing nurse anesthetists. Many hospitals long employing nurse anesthetists are endeavoring to enlarge their staffs to meet the demands of increased patient care. Hospitals heretofore not employing nurse anesthetists are now seeking their services. An increased number of nurse anesthetists are also being employed by dentists, surgeons, and industry, and they are now considered an essential part of the Army and Navy medical personnel.

Let those of us who may still be kneeling at the "wailing wall" of uncertainty over the future of the nurse anesthetist look up and discover that the wall has crumbled, not as the walls of Jericho by shouts and blasts of trumpets, but quietly by the worth of a service rendered over the past fifty years. Not only will we discover the absence of a wall, but also we will discern the need for a greatly expanded program of training for nurses in anesthesia—an urgent need if hospitals are to have a sufficient number of anesthetists for adequate anesthesia service.

Since its inception, the American Association of Nurse Anesthetists has been consistently raising the standards for membership, thereby bringing about the placement of increasingly better qualified anesthetists in the field. This we must continue to do, but if we are to meet the challenge of providing hospitals with adequate anesthesia service, we must now expand our efforts in a new direction—that of encouraging the training of a larger number of well qualified nurse anesthetists. —MIRIAM G. SHUPP, CLEVELAND

Looking Ahead

One of the big events of the year for the directors and teachers of anesthesiology is the Schools of Anesthesiology Assembly held in conjunction with the annual meeting, this year on Sept. 20-21 in St. Louis. As vital as this meeting is to the nurse anesthetists connected with the training of nurses in anesthesia, it created such widespread interest among association members generally that the Assembly last year was opened to the entire membership. Much credit accrues to Esther Myers Stephenson, who has worked energetically to plan the programs so that the school directors will get the information for which they have expressed a need.

This year the Schools of Anesthesiology Assembly will be divided into two sessions, one a closed meeting on Sept. 20 for school directors only and the other an open meeting on Sept. 21 for the entire membership. This is being done to give the directors of schools an opportunity for an intense discussion of problems related to the schools and at the same time to give the general membership insight on a most important objective, the training of more and better qualified nurse anesthetists.

The American Association of Nurse Anesthetists recognizes that there are not only a variety of problems but a variety of ramifications of each problem in the educational program for the nurse anesthetist. Two major goals are the appointment of an Educational Director and the establishment of an approval program for the schools of anesthesia. Related objectives are the clarification of the minimum requirements for schools and the curriculum. To expedite the accomplishment of these objectives and to lay the groundwork for the approval program, the Education Committee has secured the assistance of a specialist in education.

Because of the stake that the Association has in the training of competent nurse anesthetists, another objective of our educational program is the stimulation of an interest in our members to become teachers. A big problem of the schools is insufficient help. More nurse anesthetists must be trained, and well trained, if we are to do our part in providing efficient and safe anesthesia service to all hospitals in every part of the country. This is not a problem of schools alone; it is indirectly a matter of concern to all nurse anesthetists.

Knowledge creates interest, and an unusual opportunity for the acquiring of that knowledge is the open session of the Schools of Anesthesiology Assembly on Sunday, Sept. 21. All anesthetists who have the future of the profession at heart should make an effort to be there.—MABEL E. COURTNEY, DETROIT

SOME FACTORS IN SHOCK OF INTEREST TO ANESTHETISTS

John L. Keeley, M.D.*
Chicago

Many definitions of shock have been presented,[1] but in the main most of them agree with the following description. Shock is a state of profound depression of vital functions characterized by low blood pressure, rapid but weak pulse, rapid and shallow respiration, restlessness, nausea and vomiting, and is designated "primary" or "secondary" according as symptoms supervene immediately after the injury or some hours later. Actually, it is more important to differentiate primary and secondary shock on the basis of etiology than on the basis of the time of its appearance.[2]

The fundamental disturbance in shock concerns the circulation. An adequate head of pressure throughout the vascular system is maintained by (1) the force and rate of the heartbeat, (2) volume of circulating blood, and (3) adequate peripheral resistance in the walls of the arteries, veins, and capillaries. *The outstanding single factor in the picture of fully developed shock is the disparity between the volume of the circulating blood and the capacity of the peripheral vascular system.*

Primary shock concerns a relative decrease in the effective circulating blood volume because it is due, in most instances, to vasodilatation which follows the exposure of a patient to extreme pain or fear or to other psychic causes. The shock of spinal anesthesia, since it concerns peripheral vasodilatation, could conceivably come under this classification.[3] Recovery from primary shock is usually spontaneous, and the condition is self limited. However, if there is an associated injury, the primary shock due to pain or fear at the time of the injury may merge into secondary shock brought about by actual tissue damage or hemorrhage.

Secondary shock concerns an actual decrease in the effective circulating blood volume and may be due to loss of plasma or plasma-like fluid into tissues (traumatic shock) or from surfaces in the injured area, such as occurs in burns, loss of whole blood from hemorrhage, either external or internal, or a combination of these factors.[4,5,6] Studies

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Read before the Tri-State Assembly of Nurse Anesthetists, Chicago, May 7, 1947.

*Clinical Associate Professor of Surgery, Loyola University School of Medicine.

[1] Harkins, H. N.: Recent advances in the study and management of traumatic shock. Surgery **9**:231-294, 1941.

[2] Phemister, D. B., and Livingstone, H.: Primary shock. Ann. Surg. **100**:714-727, 1934.

[3] Blalock, Alfred: Acute circulatory failure as exemplified by shock and hemorrhage. Surg., Gynec. & Obst. **58**: 551-566, 1934.

[4] Keeley, J. L.; Gibson, J. G., II, and Pijoan, M.: The effect of thermal trauma on blood volume, serum protein, and certain blood electrolytes: An experimental study of the effect of burns. Surgery **5**:872-893, 1939.

[5] Harkins, H. N.: Correlation of clinical treatment of burns with recent experimental studies. Illinois M.J. **70**:332-338, 1936.

[6] Blalock, Alfred: Principles of Surgical Care: Shock and Other Problems. (St. Louis: C. V. Mosby Co., 1940).

tend to show that "the histopathologic appearance is the same both in traumatic and hemorrhagic shock, which suggests that the basic etiology is similar."[7]

Shock may also be classified as compensated or uncompensated, although this distinction is not commonly emphasized. The factors which produce shock may bring about changes which are compensated for by vasoconstriction, which increases the peripheral resistance; by mobilization of red blood cells from the spleen (and perhaps from the bone marrow), which tends to offset a decrease in the circulating blood volume; and finally by an increased pulse rate, which tends to maintain an adequate head of pressure in the peripheral circulation. When these compensatory factors are no longer able to ward off the changes which eventually result in shock, compensation breaks down, and the typical clinical picture of fully developed shock, characterized by low blood pressure, a small fast pulse, cold clammy skin, nausea and vomiting, and restlessness, as described in the original definition, supervenes.[8]

It has recently been appreciated that many of these changes cause permanent damage to certain structures and tissues of the body. Shock, therefore, has been further classified as reversible when the vicious cycle, which begins with hemoconcentration and progresses to decreased effectiveness of circulation and eventually to anoxia, may be interrupted by restoring effective circulating blood volume, by correcting anoxia, and by stopping trauma or hemorrhage (see Figure). Shock may reach an irreversible stage with permanent damage, largely to the central nervous system. It has been shown conclusively that, at this time, treatment will not reverse the process, whether it includes drugs, blood, plasma, or oxygen or a combination of these remedies.[9,10,11] The necessity for early and prompt treatment of shock before it reaches an irreversible state is obvious.

SHOCK AND ANESTHESIA

The anesthetist's interest in shock must be ever present. In her preoperative visit to the patient, an explanation of what is going to be done and the reasons for it are valuable forms of psychotherapy. It requires careful judgment to determine how much the patient should be told about the proposed anesthetic and operative procedures. The general condition of the patient should be evaluated, especially with regard to anemia, the presence of debilitating disease, fever, and cardiac complications, because these conditions predispose to early onset of shock in the anesthetized or injured patient.

It is well for the anesthetist to know beforehand the average range of blood pressure of a patient about to undergo an anesthetic so that variations in the blood pressure may be considered with respect to the average pressure for the particular patient. The arbitrary level of systolic pressure of 80 mm. Hg as an absolute minimal pressure short of shock may be satisfactory for a patient with a normal systolic pressure of 120 mm. Hg. However, a hypertensive patient with a blood pressure of 120 mm. Hg may be in just as serious a condition as the patient with the normal blood pressure is when his blood pressure falls to 70 or 60 mm. Hg or lower.

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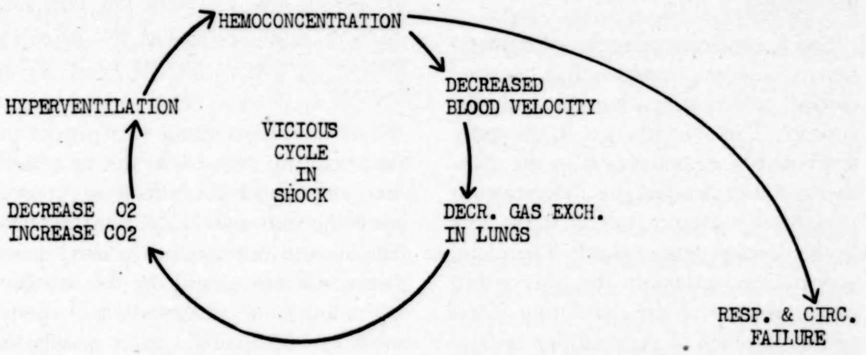
[7] Davis, H. A.: Factors in production and treatment of shock: Experimental study. M. Ann. District of Columbia **6**:344-349, 1937.

[8] Keith, N. M.: Blood volume in wound shock. Report of Shock Committee, English Medical Research Committee (London: His Majesty's Stationery Office, 1919) pp. 36-44.

[9] Fine, Jacob: Traumatic shock incurable by volume replacement therapy. Ann. Surg. **122**:652-662, 1945.

[10] Dunphy, J. E.; Gibson, J. G., II, and Keeley, J. L.: Observations on the pathology of shock. Surg., Gynec. & Obst. **72**:823-833, 1941.

[11] Dunphy, J. E., and Gibson, J. G., II: The effects of replacement therapy on the pathologic changes in experimental traumatic shock. Surgery, to be published.



With regard to premedication, there should be a careful selection of the drug ordered and of the dosage necessary. Due respect should also be paid to the time of administration so that the drug will act over a sufficient period to bring about its full therapeutic effect. In passing it may be said that factors which interfere with the ordinary action of preanesthetic drugs should be avoided. The patient should be disturbed as little as possible after receiving his premedication. Relatives and others should be kept from conversing with him; the room in which he is allowed to remain should be quiet and free from any but subdued light. In order that this general theme may be carried out, quiet and careful handling of the patient should be the rule in the operating room suite itself.

Local and Regional Anesthesia

In patients who are sensitive to cocaine or its substitutes, reactions presenting the signs and symptoms of shock may occur after local or regional anesthesia is instituted. A slow pulse distinguishes the reaction to cocaine and its substitutes from the usual clinical state of shock.[12] Reactions of this kind may be prevented by avoiding the use of cocaine or its substitutes in patients with a previous history of idiosyncrasy to these drugs. As another prophylactic measure, every patient receiving cocaine or its substitutes should be given some form of barbiturate as premedication. If reaction to these drugs has fully developed, respiratory paralysis may supervene, and it may be necessary to give artificial respiration and provide an adequate supply of oxygen. In fact, in many instances, these measures have been life saving in patients reacting in this manner. In extreme cases, a valuable antidote is a barbiturate given intravenously, but the anesthetist must not desert the patient and interrupt the application of artificial respiration and the administration of oxygen to give the barbiturate. Unless an assistant is present to administer the barbiturate intravenously, it would be better to continue the artificial respiration and the oxygen.[12]

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[12] Waters, Ralph: Procaine toxicity: Its prophylaxis and treatment. J. Am. Dent. A. **20**:2211-2215, 1933.

Shock occurring after the administration of a spinal anesthetic has been accorded considerable thought and discussion. This disturbance is generally attributed to vasodilatation in the anesthetized area leading to a decrease in peripheral resistance, one of the factors in the development of shock. Therefore, a disparity develops in the relationship of the volume of the circulating blood to the capacity of the vascular system. The cardiac action is usually unaltered, and shock in spinal anesthesia comes on sufficiently rapidly that one would not suspect an actual decrease in the circulating blood volume.[13] The third factor in the maintenance of normal blood pressure is at fault, i.e., a decrease in peripheral resistance due to vasodilatation. It is in this particular situation that drugs designed to cause vasoconstriction are most effective.[14,15] These drugs may be used prophylactically and routinely administered with the spinal anesthetic. After the blood pressure has fallen, it may be raised by the administration of vasoconstricting drugs such as adrenalin, epinephrine, and neosynephrin. In many instances, during or after the use of spinal anesthesia, it is noticed that, although the blood pressure is low, the pulse rate does not increase appreciably, and the patient's general condition appears to be satisfactory.

The careful handling of a patient in the operating room so as not to arouse him and dispel the effects of proper premedication should be remembered. The smooth induction of general anesthesia will aid greatly in the satisfactory conduct of an operation in many ways. It will guard against anoxia, it will aid in avoiding the production of large amounts of mucus, and absence of struggling on the part of the patient will prevent an increase in the oxygen need of his tissues. It has been shown that shock is more likely to supervene when the trauma of an operation, however small, is inflicted upon a patient who is inadequately anesthetized. The anesthetist must judge when the patient is sufficiently anesthetized to warrant the surgeon's beginning the operation, and the operation should not be started until the anesthetist gives approval. It has been well established that inadequate oxygenation of tissues increases or perpetuates circulatory deficiency by causing increased capillary permeability with local loss of fluid. It is therefore desirable that there should be no anoxia, but if it is impossible to avoid a period of anoxia during the induction of the anesthesia, this must be promptly corrected. It must be remembered that many general anesthetic agents cause hemoconcentration which, as we have seen, is one of the early changes in shock.[16,17]

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[12] Ibid.

[13] Harkins, Henry: Shock and anesthesia. Anesth. & Analg. **21**:273-279, 1942.

[14] Silvers, H. I., and Leonard, I. E., Jr.: The use of neosynephrin hydrochloride in maintaining blood pressure during spinal anesthesia. Am. J. Surg. **50**:79-83, 1940.

[15] Johnson, C. A.: (a) Ephedrine sulfate in treatment of acute shock from trauma or hemorrhage: Clinical use. J.A.M.A. **94**:1388-1390, 1930; (b) A study of neosynephrin hydrochloride in the treatment of acute shock from trauma or hemorrhage. Surg., Gynec. & Obst. **63**:35-42, 1936; (c) Neosynephrin hydrochloride in the treatment of hypotension and shock from trauma or hemorrhage. Surg., Gynec. and Obst. **65**:458-463, 1937.

The anesthetist must be alert to all of the factors predisposing to shock. The prevention of shock is a much more efficient and intelligent approach to the problem than any amount of treatment after it has developed. It is axiomatic that a *graphic* record of the blood pressure, pulse, and respiratory rate should be kept throughout the entire period of anesthesia. It is much easier to see the trend of the blood pressure and other findings when displayed graphically than when shown as a series of figures which are indistinguishable one from another except upon close inspection. At all times, the anesthetist must be on the alert for signs of anoxia. Many times the state of shock and its development may be suspected when there is peripheral vascular collapse and when venipuncture is difficult or impossible owing to collapsed veins. The anesthetist should watch the course of the operation and thus be forewarned of the possibility of shock by considering the extent of the operation and the amount of blood lost. It has been shown that patients undergoing the more common major operations may lose as much as 500-1,200 cc. blood.[18,19]

The anesthetist should anticipate the precipitation of shock in changing the position of an anesthetized patient, e.g., in turning the patient from the recumbent position to the Sims', prone, or another position as is often done, for example, in the conduct of the perineal part of an abdominoperineal resection of the rectum. In an anesthetized patient, there is vasomotor instability which interferes with the rapid adjustment to gravimetric changes which is necessary for maintenance of stable blood pressure. In shock and injury and after the administration of sodium nitrite, postural changes have been shown to be followed by a considerable fall in blood pressure.[20,21] If the patient's position must be changed during anesthesia, the fall of blood pressure may be lessened by the intramuscular administration of 0.2-0.4 cc. of a 1:1,000 solution of adrenalin five minutes before the change of position is to be made.[22] In relation to this factor in shock, it is well to emphasize that the patient who is in shock or whose condition borders on shock should not be moved from the operating table to a cart or bed until his blood pressure has become stable at a safe level. Many times such a patient is moved to make room for the next patient in the same operating room, and by the time he reaches his bed or room, the blood

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16. Elman R.; Weiner, D. D., and Cole, W. H.: Effects of a general anesthetic (sodium amytal) on the erythrocyte count following hemorrhage. Proc. Soc. Exper. Biol. & Med. **32**:793-796, 1935.

17. Essex, H. E.; Seeley, S. F.; Higgins, G. M., and Mann, F. C.: Effect of ether anesthesia and amytal anesthesia on the erythocytic findings in control and splenectomized dogs. Proc. Soc. Exper. Biol. & Med. **35**:154-156, 1936.

18. Gatch, W. D., and Little, W. D.: Amount of blood lost during some of the more common operations. J.A.M.A. **83**:1075-1076, 1924.

19. Wangensteen, O. H.: Controlled administration of fluid to surgical patients including description of gravimetric methods of determining status of hydration and blood loss during operation. Minnesota Med. **25**:783-789, 1942.

20. Duncan, George, and Sarnoff, Stanley: Studies on the effects of posture in shock and injury. Ann Surg. **120**:24-33, 1944.

21. Weiss, S.; Wilkins, R. W., and Haynes, F. W.: The nature of circulatory collapse induced by sodium nitrite. J. Clin. Investigation **16**:73, 1937.

22. Eversole, Urban: Anesthetic emergencies. New England J. Med. **214**:468-472, 1936.

pressure may no longer be obtainable. Considerable effort may then be necessary to raise the blood pressure above shock level.

OPERATING ROOM TREATMENT OF SHOCK

The first step in the treatment of impending or established shock is to provide adequate oxygen to the vital centers of the brain. This is accomplished by lowering the head and elevating the foot of the operating table or bed.[6] This aids materially by increasing venous return and also by increasing the pressure in the carotid arteries with resultant improvement in cerebral circulation. These effects may be further augmented by suspension of the extremities in a vertical manner from an overhead support. Cerebral anoxia may be corrected to some extent by increasing the concentration of oxygen in the anesthetic mixture or by administering oxygen alone. The beneficial effects of oxygen in shock are now well established.[23,24] Artificial or controlled respiration by means of the rebreathing bag on the anesthetic machine may be used to carry higher concentrations of oxygen into alveolar spaces, and, since circulation and respiration are parallel functions in the pulmonary bed,[25] it will aid the passage of blood through the pulmonary capillaries and accelerate its oxygenation. Recently, Thompson, Quimby, and Smith again demonstrated that artificial respiration moves blood through the cardiovascular system in an effective manner.[26]

It is well established that shock is more readily precipitated and more difficult to correct in a chilled patient. However, the application of external heat, once thought to be of value in the treatment of shock, has recently been investigated. Although the problem is not entirely settled at present, the trend is to conserve body heat by a suitable covering such as a warm blanket, but to avoid the application of any great amount of heat (by means of hot water bottles or heating pads) lest vasodilatation increase the disparity between the circulating blood volume and the capacity of the vascular bed.[27]

Next in order of treatment is an effort to correct the disparity between the circulating blood volume and the capacity of the vascular system by the administration of fluids intravenously actually to increase the total circulating blood volume. There is a growing belief that the best fluid for this purpose is whole blood, but often saline or dextrose solution or plasma is more readily available. To patients who have suffered considerable blood loss or in whom shock has been difficult to correct, whole blood should be given as soon as it can be obtained. Fluids given intravenously for shock should be administered rapidly until the desired response in the blood pressure is brought about. The rate is then decreased to the usual 250 cc. per hour, the maximal rate of administration in patients with normal cardiovascular systems. In a desperate situation, the administration of fluids or blood need not necessarily be confined to one vein. Two or three setups for fluid administration may be used, not so much for the correction of traumatic shock as for blood replacement in operations accompanied by severe blood loss, such as extensive or prolonged operations, operations for removal of highly vascular tumors, or vascular surgery.

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[6] Loc. cit.

[23] Wood, George; Mason, M. F., and Blalock, Alfred: Studies of the effects of the inhalation of a high concentration of oxygen in experimental shock. Surgery **8**:247-256, 1940.

[24] Schnedorf, J. G., and Orr, T. G.: Beneficial effects of oxygen therapy in experimental traumatic shock. Surg., Gynec. & Obst. **73**:79-83, 1941.

[25] Coryllos, P. N., and Birnbaum, G. L.: Circulation in compressed atelectatic and pneumonic lung. Arch. Surg. **19**:1346, 1929.

[26] Thompson, S. A.; Quimby, E. H., and Smith, B. C.: Effect of pulmonary resuscitative procedures upon the circulation as shown by use of radioactive sodium. Surg., Gynec. & Obst. **83**:387-391, 1946.

[27] Blalock, Alfred, and Mason, M. F.: A comparison of the effects of heat and those of cold in the prevention and treatment of shock. Arch. Surg. **42**:1054-1059, 1941.

It should be emphasized that, in a desperate situation, all of the measures suggested for the treatment of a patient in shock should be employed, but the most important single measure is the restoration of a normal or effective circulating blood volume. Therefore, valuable time should not be lost in making repeated unsuccessful attempts to puncture a vein. It takes but a couple of minutes to cut down and expose a vein directly, introduce a cannula, and thus assure the intravenous administration of supportive fluid. Davis[28] in 1937 and more recently Kendrick and Wakim[29] and Kohlstaedt and Page[30] investigated the effectiveness of intraarterial injection to correct the hypotension of shock. Theoretically, intraarterial injection should re-establish adequate circulation to vital cerebral centers earlier and more directly than intravenous therapy, particularly the injection of fluids into the veins in the lower extremities, for obvious anatomic reasons. It is recommended, however, in only the most desperate situations.

Since the most important underlying disturbance in shock is the disparity between the total circulating blood volume and the capacity of the vascular system, it is natural that consideration of the treatment at once suggests increasing the former by the use of intravenous fluids and decreasing the latter by the use of vasoconstricting drugs. There are serious objections to the use of vasoconstricting drugs in the treatment of shock:[13] In the first place, it does not correct the underlying fundamental disturbance. Secondly, in instances of so-called compensated shock, vasoconstriction is already present. Finally, when compensation breaks and the blood pressure falls, anoxia is present to a sufficient degree to render the capillaries and arterioles no longer capable of responding to these drugs. The exception, of course, is shock which may develop soon after the administration of a spinal anesthetic, in which the underlying disturbance is apparently vasodilatation and in which anoxia has not rendered the peripheral vessels incapable of reacting to the vasoconstricting drugs. Of more promise in decreasing the capacity of the vascular system is the application of pressure bandages to the extremities. Undoubtedly, this should be considered in connection with the lowering of the head and the elevation of the extremities, as mentioned previously.

Summary

It should be emphasized that the anesthetist is in a position to observe

(Continued on page 140)

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[29] Kendrick, D. B., Jr., and Wakim, K. G.: Intra-arterial hypertonic saline solution in experimental shock. Proc. Soc. Exper. Biol. & Med. **40**:114-116, 1939.

[30] Kohlstaedt, K. G., and Page, I. H.: Terminal hemorrhagic shock. Surgery **16**:430-465, 1944.

[13] Loc. cit.

ANESTHESIA FOR CHILDREN

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Anesthesiology, like every other branch of medicine, has made tremendous strides during the past 25 years. During my period of training and early days in dispensary work, I used to give lots of anesthetics, that is, I rendered patients unconscious with one of two anesthetic agents, ether or nitrous oxide. When ether was given as an anesthetic for abdominal surgery, the ether was poured out of a can onto a mask until the patient was somewhere in the realm of unknown ether narcosis. A wet towel was draped, according to the custom of the day, about the ether mask so that the patient could not get any air which might dilute the ether vapor. So long as the patient's pupils were not completely dilated, I continued to pour ether on the mask. The administration of nitrous oxide to patients in the outpatient department was still worse. The old McKesson machine was set to deliver a concentration of 95 per cent nitrous oxide with 5 per cent oxygen. From that point on the patient breathed at his own risk. As soon as his color changed from pink to blue, he was ready for the reduction of a fracture or whatever procedure was indicated. Anesthesia by asphyxiation one might well call it. In those days I personally was fortunate in not having a catastrophe, but there were plenty of misfortunes throughout the country. Most of them were explained away on the basis of the patient's having a bad heart which could not withstand the strain of an anesthetic.

Anesthesiology has travelled a long way since then. It seems strange in retrospect that the obvious facts were not recognized when they were so apparent. It has been the same in every branch of medicine. Obvious facts unrecognized became common knowledge, and we say, "How could we have been so stupid?"

Each specialized field of medicine is automatically breaking up into still smaller fields of specialization, and accordingly we have the field of anesthesia for children. Anesthesia for children means anesthesia for infants under 18 months of age and for children through age 12. First of all, an anesthetist who wishes to specialize in anesthesia for children must love children—not only the cute ones but the ornery ones who bite your finger, scratch, spit, scream, and struggle. One cannot argue with a child under age 3 or 4, nor can one explain what is being done or why. A lot of monkeyshines, such as looking at the "birdie" while a mask is snapped over the face, merely add to the confusion. Some children, even at an early age, will co-operate and show interest in what is going on. Boys ask questions about instruments and appliances. Girls are interested in

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*Surgeon-in-Chief, Children's Memorial Hospital.

what the nurses are wearing today. A few moments of friendly interest will be well spent even though the surgeon has to wait. He probably is too temperamental anyway, and a bit of waiting will do him good. Some years ago a child, aged 5, had her tonsils removed at a hospital elsewhere. She got the notion she was to be killed instead of anesthetized. She screamed and wanted to talk. Her terror was great. No time was taken to explain what was going to be done because lots of tonsils had to be removed that day. The child was overpowered when she struggled and was anesthetized. Her tonsils were removed, and she recovered normally from the operation. However, she was under the care of a psychiatrist for two years before she got rid of the night terrors associated with her experience in the operating room. Last week a child, aged 3½, was put to sleep at the Children's Memorial Hospital for a herniotomy. I walked into the operating room at the beginning of the administration of the anesthetic. What irregularity do you suppose I saw? The child had both hands loose and was holding the ether mask over his own face. It was a perfect anesthesia. To him the operating room experience was a lark.

Since it is difficult and often impossible to argue with many of these children, we must make the best possible use of an agent most important to any good anesthesia—preoperative medication. To do this efficiently is difficult because children react differently from adults. In addition we still have hanging over our heads a fear of morphine inherited from the early part of the century when difficulty in respiration during anesthesia was always assigned to the use of morphine instead of being correctly assigned to improper exchange of gases. Proper premedication produces quiet breathing, and less anesthetic agent is needed.

I shall discuss the subject of premedication and the anesthetic agent of choice according to four age groups, as suggested by Cullen of Iowa, because age is the most important factor in determining the dosage of any drug and the proper anesthetic agent. Weight is, of course, important, and the general state of nutrition of a child must not be overlooked.

Group 1 comprises infants up to age 1. Since most operations on infants under 1 year of age are done in the first few weeks of life, the discussion primarily concerns the newborn. An infant, contrary to the belief of the general public, tolerates anesthesia and major surgical procedures better than the average adult. The infant is subject to less nausea and other complications and has the advantage of being unable to discuss its operation with others. The margin of safety in anesthesia is not so broad for infants as it is for adults, but their tolerance and instinctive will to live are astounding.

For the routine case, ether is the anesthetic of choice. In fact, except for unusual conditions, such as tracheoesophageal fistula, congenital diaphragmatic hernia, and other operations in which the chest must be opened, in which the lung space available for respiration is small, and in which pressure anesthesia is essential, we use ordinary open drop ether. Nitrous oxide, ethylene, and local anesthetics have no place in anesthesia for infants under 1 year of age. If those surgeons who use local anesthesia for pyloric stenosis would trust the anesthetist to give ether, they would have their operating time cut in half, better healing of the wounds, and far less strain on their own coronary arteries. One cannot do good surgery on a wiggling infant.

Preoperative medication for infants consists of one drug and that is not used routinely. Atropine sulfate, 1/600 gr., is of value in lessening bronchial secretions.

Group 2 comprises children from 1 to 2½ years of age. Our attitude concerning anesthesia for these children is practically the same as that for infants. This sounds old-fashioned. The preoperative medication consists of nembutal or seconal, ½ to ¾ gr. by mouth or 1 gr. by rectum. Atropine sulfate, 1/200 to 1/400 gr., is given hypodermically. Some children will become very red after receiving atropine in these doses and develop some fever. We have seen no harm from this and have not cancelled an operation because of it. Ether is by all odds the anesthetic of choice. For the average anesthetist, the simpler the anesthetic agent and the broader its margin of safety, the less trouble will be encountered. It is not old-fashioned to give ether although it is 100 years old. Development of new methods of anesthesia which are available, I suppose, should be fostered at large children's hospitals such as ours, but for the routine cases the trust we have in ether is hard to modify. We have not used pentothal sodium anesthesia for children but have no objection to its trial.

Group 3 comprises children 2½ to 5 years of age. This group presents a few new problems for consideration. These children can tolerate morphine. The morphine is usually given subcutaneously, but in an emergency it may be given intravenously. It is unfortunate that there is an aversion to giving morphine intravenously. More harm can result from giving morphine subcutaneously 15 minutes before an operation than from giving the same amount intravenously immediately before operation. If the operation lasts ½ to ¾ of an hour, the full effect of the morphine given subcutaneously 15 minutes before operation and the effect of the anesthesia come at the same time and result in serious depression of respiration.

In this age group, morphine sulfate, gr. 1/12, plus atropine sulfate, gr. 1/200, is the average dose given approximately one hour before operation. A word of warning is in order. If the child is small for its age or has had a long-standing debilitating disease, the dose of morphine must be reduced to 1/16 gr. The average husky child requiring an emergency or elective operation will tolerate 1/12 gr. morphine. A dose of nembutal or seconal the previous night or several hours before operation will quiet the child and, incidentally, the parents.

Ether again is the most commonly used anesthetic agent. Ethylene alone or in conjunction with ether may be used for anesthesia of short duration requiring little relaxation. Cyclopropane may well be used if its properties and potency are well understood. If straight ether is to be used, induction with a little vinethene or ethyl chloride lessens tremendously the psychic shock to the child. Whenever either of these agents is used, strict attention must be given to avoid overdosage and too concentrated a mixture of the gas. A heavy blast of either of these potent agents is toxic and may cause respiratory arrest. I think the nurse anesthetist — any anesthetist — should see these children the night before the operation if possible. The physician usually does not have the time. The child is going to see the anesthetist the next morning, and the confidence established by an evening visit is a grand thing. The child knows there is someone in the operating room who is a friend and who isn't going to do something terrible to him.

Group 4 comprises children age 5 to 12. These children approach the adult group in their reactions. Barbiturates are administered to them the night before operation. The average husky child who has not had a long debilitating disease will take ⅛ gr. morphine with 1/200 gr. scopolamine. Morphine and scopolamine are best given in the ratio 1:25. Therefore, ⅛ gr. morphine with 1/200 gr. scopolamine is the drug of choice for this age group. Scopolamine is effective in counterbalancing the respiratory depression of morphine, produces better psychic sedation, and inhibits nausea. The only reason for not giving scopolamine to children under age 5 is that in the very young, as in the very old, unfavorable side reactions are produced. As stated previously, ⅛ gr. morphine is usually used with scopolamine. However, in children aged 10 to 12 it is perfectly safe and advisable to give 1/6 gr. morphine with 1/150 gr. scopolamine. The choice of anesthetic agent for these patients depends on the ability and experience of the anesthetist. If her training has been adequate in the use of cyclopropane, it is a fine agent for smooth relaxing anesthesia. In case of doubt, ether is still very safe as a routine day-to-day anesthetic. Curare is a great drug with a real place in anesthesia. Again, knowledge of its properties and actions is essential.

Spinal anesthetics have no place in anesthesia for children.

Ethyl chloride should, if used at all, be confined to inductions or anesthesia requiring only momentary analgesia, such as is needed for opening an ear or pulling a tooth.

Vinethene is a potent drug, rapid in action, with quick induction, and the patient makes a prompt recovery. It is satisfactory for short anesthesias, but if too much is given, there may be respiratory failure. Its use has been discontinued at one of the large children's hospitals in this country because of two cases of respiratory arrest. It has a definite place, but overdosage with a too high concentration of the drug must be carefully avoided. It is tempting to use powerful agents more and more freely, and the impulse should be curbed.

Local anesthesia for children in general is a complete failure. Except for very minor operations, I avoid using it.

A few well known facts about anesthesia are worthy of repetition at frequent intervals.

1. We cannot live without oxygen; neither can the anesthetized patient. Nothing in the operating room disturbs me as much as the sight of dark blood. The blood should never be dark. If it is, the anesthetist not only is justified in asking the surgeon to stop the operation, even though the patient wakes up and the operation is delayed, but is obligated to see that the condition is remedied at once. A patient

with low hemoglobin requires more oxygen and less anesthetic agent than the patient with a normal red blood cell count.

Probably the most common reason for inadequate oxygenation is the failure to use, or the improper use of, an airway. Airways of proper size for children are so important that without them no anesthesia is safe. Dr. Cullen in his book on anesthesia says that 90 per cent of deaths occurring in patients under anesthesia are due to improper management of the airway. I recommend his book most emphatically for the chapters on oxygen and the airway.

On Labor Day last year I operated upon a 4 pound premature baby with congenital atresia of the duodenum. The infant's condition was precarious. It was anesthetized with ether. About the time the abdomen was opened, the baby's condition became grave. All anesthesia was stopped, and oxygen alone given. The baby remained asleep on oxygen anesthesia even through closure of the abdomen. It survived the operation well.

2. The air passages are apt to be obstructed by vomited food, water, or mucus. Any patient with obstruction of the gastrointestinal tract from pylorus to rectum should have a catheter introduced into the stomach before the anesthesia is started. Aspiration of any accumulated fluid is then carried out, and the catheter is left in place during the anesthesia.

I used to have the stomachs of infants with pyloric stenosis washed preoperatively but did not keep the catheter in the stomach during the operation. One day, some years ago at another hospital, during a Ramstedt operation, the anesthetist suddenly said, "The baby has stopped breathing. I think it's dead"—a rather abrupt statement. I looked at the infant's cyanotic face. It looked like a drowning child. I tossed off the sterile drapes and picked up the child by its feet. Water ran out of its nose and mouth. Breathing promptly was restored in the baby as well as the surgeon. The operation was completed, and the child fortunately recovered without even a wound infection. A catheter in the stomach during the operation would have avoided this near catastrophe.

Any infant with congenital atresia of the bowel or any child with intestinal obstruction, even though Wangensteen suction has been employed preoperatively, is safer with a catheter in the stomach during anesthesia.

3. Ether convulsions—we have had a few fatal cases—are frightening. In our experience they occurred on hot humid days in children with high temperatures who were given ether. We now know that the cause was inadequate oxygenation and improper elimination of carbon dioxide. At the first sign of a convulsion, twitching, oxygen should be given and measures taken to prevent interference with the elimination of carbon dioxide. Barbiturates given intravenously are of value but are not the first consideration. After adequate oxygenation and a clear airway have been established, barbiturates may be given but usually will not be necessary.

After an operation, if there is the slightest question of the baby's condition or if any degree of shock is present, the child should be given oxygen until the heart rate becomes normal and it is resting quietly. The anesthet

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ANESTHESIA FOR NEUROSURGERY

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Although it is not generally realized, neurosurgery carries no greater risk than general surgery. As is true of general surgery, the seriousness of the neurosurgical procedure depends to a large extent upon the condition being treated and the stage at which the diagnosis is made. Although the patient's condition gives us cause for concern in a large percentage of cases, we have performed as many as 87 consecutive major operations and as many as 25 consecutive brain tumor operations without a death. This has been made possible by advances in neurosurgical technics, improved methods of supportive treatment, more accurate diagnosis, and, in no small measure, to better anesthesia. Not only because of the somewhat greater seriousness of the condition of the average patient undergoing neurosurgery, but also because of certain unique features, such as the effect of anesthesia on intracranial pressure, the use of electrocautery, and other factors, anesthesia for neurosurgery deserves special consideration.

Dangers from Use of Electrocoagulation Unit

All highly explosive gases, such as ethylene, are contraindicated when an electrocoagulation unit is used. Under the same conditions, the use of open drop ether seems to be attended by little danger since ether vapors are heavy. Ventilation should be good, however, and ether should not be mixed with oxygen. Although we have seen no need for alarm in the use of cyclopropane, provided there is good circulation of air in the operating room, other disadvantages of this agent, such as its production of increased intracranial pressure and blood pressure, detract from its value.

Increased Intracranial Pressure and Bleeding

In intracranial operations, the type of anesthesia and the way in which it is administered have a great deal to do with the production of increased intracranial pressure and bleeding. Anoxia from any cause will increase both intracranial pressure and blood pressure. If, in addition, the patient coughs or strains against a partially open airway, surgery becomes impossible. The possibility of harm is lessened if the surgeon, during the course of the operation, is able to lower intracranial pressure by tapping a ventricle or cyst or by removing a tumor. High intra-abdominal pressure, such as that which is produced when the patient is in the prone position, increases venous distention and further aggravates increased intracranial pressure and bleeding. Nothing contributes as much to a smooth operation as the smooth induction of the anesthesia.

Position of the Patient

The position of the patient is important from the standpoint of the

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surgeon and the anesthetist as well as the patient. During a long operation, the comfort of all three is a desirable goal and can usually be obtained.

In intracranial operations, bleeding is decreased if the patient's head is elevated sufficiently to prevent an increase in venous pressure. By this means, intracranial pressure is also reduced.

In many clinics, certain operations, such as those for removal of cerebellar tumors, are performed with the patient in the erect position. This has the advantages of reducing bleeding and of providing good exposure. Having the patient in this position, however, is quite disconcerting if there is a drop in blood pressure. The occurrence of air embolus has also been reported. It has been a time-honored custom to perform all operations on the trigeminal nerve with the patient sitting erect. This practice often imposes strain on the patient, who is usually elderly. An almost as good reduction in bleeding can be obtained if the patient is placed in a 30 degree reclining position with his head up. If the prone position is used for cerebellar operations, the patient's shoulders should be considerably elevated with supports, and supports should be placed along each side of the body to avoid direct pressure on the abdomen.

For the past four years, I have performed all cerebellar operations with the patient lying three quarters of the way over on his abdomen, the shoulder and hip on one side being supported with pillows. The table is slanted upward so that the patient's head is well above the level of his heart to keep venous pressure low. In prolonged procedures this position is comfortable for the patient and the anesthetist, who may sit on a stool at the patient's side.

During operations for removal of protruded intervertebral disks, it is well to remember that the flexed position, which increases the interlamellar space, is very uncomfortable for the patient and need not be used except for the short period when the space is actually being explored. Troublesome bleeding will often stop without further attention if the table is made level.

MAINTAINING AN OPEN AIRWAY

Any obstruction to breathing increases bleeding and in intracranial operations increases intracranial pressure so much that technical difficulties may be insurmountable. Slow induction of the anesthesia and proper premedication are helpful, but use of an intratracheal tube is the only real insurance against obstruction. In the positions that we use, intubation seldom is necessary, but for cerebellar operations on patients in the prone position and for patients with increased intracranial pressure it is essential.

PREOPERATIVE MEDICATION

Morphine should not be used for the preparation of patients with increased intracranial pressure, but its use with atropine or scopolamine for other patients is desirable. Codeine with atropine may be used for patients with brain tumors, and phenobarbital or nembutal may be given preoperatively except when pentothal sodium is to be used as the anesthetic agent. Very large doses of phenobarbital sodium may be given infants for preoperative medication when local anesthesia is to be used. Our standard dose is 2 gr. for infants three months of age. When local anesthesia is used for adults, morphine or pantopon should be given preoperatively.

Reporting Patient's Condition

Pulse, respiration, and blood pressure should be recorded at least every five minutes, and any change reported to the surgeon. Recordings should be made more frequently if any variation from the normal is observed. If the vital signs are recorded on a blackboard, the surgeon can see the situation at a glance. This is particularly helpful when the patient is under local anesthesia. Before a general anesthetic is given for operations for tic douloureux or removal of herniated intervertebral disks, it is our rule that the anesthetist question the patient with regard to the site of the pain, as additional insurance against operating on the wrong side.

Type of Anesthetic

The type of anesthetic used will vary with the type of case, the condition of the patient, and the individual surgeon. The safest general anesthetic for children is open drop ether. Ether administered intratracheally is an ideal anesthetic for adults. Pentothal sodium seems to be almost as safe and is easier to administer. Avertin has been abandoned by most clinics because it is not dependable and is safe only when used as a basal anesthetic. As a rule, the level of anesthesia can be much lighter if novocain 1 per cent with adrenalin, 3 drops to the ounce, is used for infiltration. If the patient's condition is poor, novocain infiltration alone usually is the anesthetic of choice and is quite satisfactory unless the patient is very nervous or very young. It is surprising how well some youngsters will behave when it is necessary to use local anesthesia. In removing the choroid plexus in infants we have found that if the feeding is withheld and the hungry child is allowed to have his bottle during the operation, he is often too busy eating to pay much attention to what is going on, particularly if 2 gr. phenobarbital sodium is given two hours preoperatively.

The following outline of types of anesthetic agents for different surgical procedures is a modification of that recommended by Bancroft and Pilcher.[1]

Carotid sinus syndrome.—A local anesthetic or ether. Pentothal sodium or cyclopropane should not be used, since they do not decrease the sinus irritability.

Cerebellum and brain stem.—A local anesthetic alone should be used in stuporous or comatose patients. Ether given intratracheally combined with a local anesthetic may be used in a conscious patient who will not submit to a local anesthetic alone.

Cerebrum.—A local anesthetic alone or combined with ether given intratracheally or pentothal sodium.

Cervical spine.—Pentothal sodium or ether given intratracheally with a local anesthetic, or a local anesthetic alone.

Hydrocephalus (plexectomy, etc.). — Local anesthetic.

Cortical extirpation for epilepsy. — Local anesthetic.

Cranioplasty.—Local infiltration or pentothal sodium.

Sympathectomy for hypertension. — Ether given intratracheally; closed system so that the lung may be kept expanded in case of pleural tear.

Meningomyelocele.--Local infiltration.

Spinal cord.—Ether, pentothal sodium, etc.

Intervertebral disk operation. — Combined low spinal and local anesthesia, or general.

Stimulants, Shock, Artificial Respiration

Few stimulants are effective except for a short period. Adrenal cortical extract is quite successful in maintaining blood pressure, provided its administra-

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[1] Bancroft, F. W., and Pilcher, Cobb: Surgical Treatment of the Nervous System (Philadelphia: J. B. Lippincott Co., 1946).

THE ROLE OF ANESTHESIA IN OBSTETRICS

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The first physician to use anesthesia in obstetrics was Sir James Simpson of England, who, in 1847, gave an anesthetic to a mother before delivering her of a child. For his use of anesthesia for this purpose, Simpson was harshly criticized by the church. The prevention of pain during childbirth, he was told, was contrary to the tenets of the church and the express command of the scriptures, as set forth in the third chapter of the Book of Genesis: "I will greatly multiply thy sorrow and thy conception; in sorrow thou shalt bring forth children." But anesthesia had come to stay, and on April 7, 1853, Sir John Snow anesthetized Queen Victoria when she was delivered of Prince Leopold.

The employment of analgesia and anesthesia in obstetrics is now accepted as an established practice. It is no longer a question of whether analgesia and anesthesia should be used, but rather what agents should be used and how their use can be made safer. At present, as is evidenced by the ever increasing number of agents and methods, no one method of inducing anesthesia is ideal for every procedure from the viewpoint of the obstetrician, the anesthetist, and the patient. The obstetrician is primarily concerned with the safety of the mother and the baby. Only after this is assured will he consider relaxation and other factors which will permit him to carry out an uninterrupted procedure and which will insure an uneventful postoperative recovery for the patient. The anesthetist's first concern is also the patient's safety. In addition, she must satisfy the obstetrician, assure the patient of freedom from pain, and reassure the patient about fear of pain and loss of consciousness. No one agent satisfies all the demands for an ideal method of anesthesia, and some doubt must be entertained that one will ever be found. A method that may meet the requirements of the obstetrician may be detrimental to the patient.

In obstetrics, individual anesthetic agents have certain disadvantages. Nitrous oxide and oxygen, in a concentration of 70 per cent nitrous oxide, is a pleasant and safe anesthetic, but does not produce sufficient relaxation and is a marked depressant of fetal respiratory efforts. Ether is safe within a wide range and produces good relaxation, but it causes gastrointestinal disturbances and irritation of the respiratory tract. Chloroform is a cardiac depressant, as is ethylene if not given with sufficient oxygen. The use of spinal, local, and regional anesthesia has proved satisfactory in the hands of experienced surgeons but is limited to certain types of patients.

From all the various types of anesthetic agents it becomes necessary to select one or several which are most useful and practical in view of the pa-

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tient's condition and the obstetric procedure to be carried out.

CYCLOPROPANE

Cyclopropane was first used for obstetric anesthesia in 1933 by Waters. Since then the frequency of its employment for anesthesia in obstetrics has increased rapidly until today, according to Tovell,[1] it has replaced other agents formerly used in many obstetric clinics.

All our patients receive scopolamine as an amnesic agent during labor, and many of them become quite active, making it a herculean task to restrain them while anesthesia is induced. Ether, being irritating to the patient, increases this activity, and getting close enough to the patient to administer the agent effectively becomes a problem. It was this difficulty that first occasioned our use of cyclopropane, and we have used it consistently for the past two years. At present it is used as the induction agent or the sole anesthetic agent for 90 per cent of our patients to whom an inhalation anesthetic is administered.

Cyclopropane is the most potent of the anesthetic gases, but may be administered with a higher concentration of oxygen than any other agent. A 3-5 per cent concentration will produce analgesia in 5-10 minutes; a 6-8 per cent concentration will produce unconsciousness in the same period; a 20-25 per cent concentration will anesthetize the average patient. A 40 per cent concentration will induce respiratory failure with paralysis of the respiratory center.[2] That cyclopropane is a nonirritating gas with a sweet odor is to us a very attractive feature.

When cyclopropane is used, the induction period is rapid and peaceful in contrast with the turbulent phase during induction of anesthesia with ether. The patient also rapidly passes through the vomiting stage; this is another attractive feature since often a patient is admitted to the delivery room floor in the terminal stages of labor shortly after she has eaten a multicourse meal.

The uterine contractions are not lessened in light anesthesia with cyclopropane, but they are entirely abolished in the third plane of the surgical stage. Accordingly, the first plane of the third stage of anesthesia is recommended for normal delivery, especially of multiparas, and for any minor operative procedures, such as repair of lacerations or small episiotomies. If additional relaxation is needed for low forceps delivery, especially in primiparas, for version and extraction, or for breech deliveries, the cyclopropane is discontinued and drop ether used as the method of choice.

The abundance of oxygen in the cyclopropane-oxygen mixture insures an adequate supply of oxygen to the fetus. It has been stated that the concentration of cyclopropane in the fetal blood equals that in the maternal blood in 15 minutes, and that the oxygen content in the arterial blood of the fetus is decreased approximately 20 per cent.[1] I have observed no increased need for resuscitation of babies after the administration of cyclopropane to the mother if the anesthesia is of average duration. If ether is used in addition to, or is substituted for, cyclopropane, the respiratory depression of the fetus is more marked, especially in those babies whose mothers have received a large amount of a sedative or have been given premedication close to the time of delivery.

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[1] Tovell, R. M., and Edmondson, R. E.: Modern concepts of cyclopropane anesthesia. South, M. J. 35:25-32, Jan., 1942.

[2] Lull, C. B., and Hingson, R. A.: Control of Pain in Childbirth (Philadelphia: J. B. Lippincott Co., 1944) p. 65.

[1] Loc. cit.

We use cyclopropane anesthesia for many of our patients undergoing cesarean section, especially when blood loss or shock is a prominent factor. Hershey and Rovenstine have demonstrated the favorable action of cyclopropane in the presence of acute blood loss, the cyclopropane-oxygen mixture tending to maintain blood pressure and more nearly normal values of oxygen saturation of maternal and fetal blood.[3] For this same reason, we use cyclopropane anesthesia for many of our patients undergoing curettage and packing of the uterus after an incomplete abortion. We believe that the amount of bleeding during the operation is much less than that which occurs when ether or a nitrous oxide-oxygen mixture is used.

Cyclopropane anesthesia is also valuable for the parturient woman with cardiac disease; the ease of induction and the high proportion of oxygen in the mixture provide a course of anesthesia which places no extra or undue strain upon an already damaged heart.

Because of the high proportion of oxygen in the mixture, we like to use cyclopropane to anesthetize patients who have upper respiratory tract infections. Because of the low incidence of pulmonary complications attending the use of cyclopropane, it is indicated for patients with healed, arrested, or minimal tuberculosis.

For several cesarean sections we have used curare in 2-3 cc. doses as a supplement to cyclopropane, the resultant relaxation being excellent. We have also used curare as a supplement to cyclopropane in a series of six cases of elective internal podalic version with breech extraction. The results were just what one might expect: The perineum was well relaxed, but the uterine muscle remained irritable and tight, making the procedure difficult to execute. Accordingly, this practice has been discontinued.

PENTOTHAL SODIUM

An impressive development in the science of anesthesia was that of intravenous anesthesia. Today the most commonly used agent for this method is pentothal sodium, introduced into clinical surgery by Lundy of the Mayo Clinic.

Pentothal sodium is probably the best hypnotic in use today; no other produces sleep as rapidly and pleasantly or allows a more pleasant awakening. For a very few minutes after the initial sleep-producing dose, the agent produces fair muscular relaxation. However, it does not block pain pathways with any efficiency. Therefore, with an ordinary sleep-producing dose the patient shows marked muscular activity when stimulated. A dose sufficient to bring about surgical anesthesia and true muscular relaxation also produces a varying degree of depression of the central nervous system. The degree of depression is proportional to the size of the dose and the rapidity of injection. However, intravenous anesthesia has many advantages and has displaced other methods in many branches of surgery. Some of these advantages may be summarized as follows:

1. Induction is rapid and easy. The patient falls asleep and quickly passes into a stage of surgical anesthesia without coughing, struggling, excitement, or vomiting.

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[3] Hershey, S. G., and Rovenstine, E. A.: Circulatory effects from cyclopropane administration after hemorrhage. Proc. Soc. Exper. Biol. & Med. 54:68-70, Oct., 1943.

2. Injection is pleasant, and there is no fear of subsequent injections.
3. Dosage is easily controlled.
4. Recovery is rapid.
5. There are few postoperative complications.
6. It is an ideal anesthetic for patients who fear inhalation anesthesia.
7. It is useful as a supplemental agent.

For cases of incomplete abortion, we use pentothal sodium to anesthetize the patient for curettage of the uterus if the patient has not bled excessively and the blood pressure is not too low. It is also used to anesthetize patients for certain types of therapeutic abortions, such as those for hyperemesis gravidarum and hypertension, and for the care of missed abortions.

We use pentothal sodium to anesthetize many patients for cesarean section; it is frequently used alone and frequently with cyclopropane or curare as a supplemental agent. The administration of pentothal is not begun until the patient is prepared and draped and the surgeon is ready to make the skin incision. As a result the baby is almost always delivered within five minutes after the administration of pentothal sodium is started. The infants are not drowsy and as a rule are not difficult to resuscitate. The postoperative course of the patient is usually uneventful with no vomiting nor distention.

Continuous Caudal Analgesia

Continuous caudal analgesia for relief of pain during labor and for eventual delivery has been employed by us in a few cases. This number is not enough to allow us to draw any conclusion. In the past few years great emphasis has been placed upon the development of continuous caudal analgesia in both the lay and the medical press. The initial reports were enthusiastic and confident; the travail of labor was no more. However, sufficient experience with the method has now been accumulated to temper those reports. Probably the most accurate and worthy evaluation of caudal analgesia has been made by Nicodemus and his co-workers at Geisinger Memorial Hospital.[4] The advantages of the method are:

1. The ease and safety of breech delivery; the utmost relaxation of the perineum is secured.
2. A lower incidence of stillbirths; analgesics and anesthetics of depressant types must be held accountable for some infant deaths.
3. Diminished blood loss; the average is less than 120 cc. in 1,000 deliveries.
4. Less damage to the birth canal because of the excellent relaxation.
5. Greater co-operation of the patient; she is awake and alert throughout the entire procedure.

The principal disadvantages are:

1. Increased length of labor, due most likely to the fact that anesthesia was begun too early in labor.
2. Less intense uterine contractions.
3. Loss of expulsive force of the abdominal muscles; the patient is unaware that she is having a contraction and does not use voluntary muscles.
4. Decreased tendency for posterior positions to rotate anteriorly, thus increasing the percentage of posterior positions.
5. An increase in operative intervention, especially in the use of mid forceps, a procedure which can be dangerous.

In any evaluation of caudal analgesia as a method of choice in obstetrics, several facts are of the utmost importance: (1) variations and anomalies of the anatomic structures must be carefully considered and the contraindications carefully observed, such as failure of the sacrum to close on the dorsal surface, a large fat pad over the sacral hiatus making insertion of the needle

(Continued on page 153)

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[4] Nicodemus, R. E.; Ritmiller, L. F., and Sedden, W. J.: Continuous caudal analgesia in obstetrics on trial. Am. J. Obst. & Gynec. **50**:312-318, Sept., 1945.

THE VALUE OF SPECIAL TRAINING IN ANESTHESIA FOR THE ARMY NURSE

Lt. Col. Katherine E. Baltz*
Washington, D. C.

As of February 1, 1947, the Office of the Surgeon General established a teaching program for the training of Army nurses in anesthesia. The hospitals at which these courses in anesthesia are being given are Brooke General Hospital, Fitzsimons General Hospital, Letterman General Hospital, Walter Reed General Hospital, and Percy Jones General Hospital. The courses consist of 11 months' training and experience in the selected Army hospitals and 2 months' experience in selected civilian institutions. The curriculum for this training program has been planned to conform with the requirements of the American Association of Nurse Anesthetists, to the end that, upon completion of the course, the Army nurse will be prepared to take the qualifying examination and become a member of the Association.

What motivated the Office of the Surgeon General to initiate these courses in anesthesia for the Army nurse? What is the value to the Army nurse of special training in anesthesia? In the first place, the Surgeon General, and Army doctors as well, have always held the nurse anesthetist in high regard. Moreover, World War II conclusively demonstrated the need for nurses trained in anesthesia, both for battlefront duty and for service in Army hospitals caring for military personnel. The very fact that the Army has founded schools for the training of nurses in anesthesia is confirmatory evidence of the value of the nurse anesthetist to the armed forces.

During the war, the ever increasing need for nurse anesthetists required the Army to initiate some program for their training. Approximately 15,000,000 patients were admitted to Army hospitals during the war, and something had to be done to provide the anesthesia service needed for these patients' care. In November, 1943, 432 nurse anesthetists were distributed among some 1,000 medical installations throughout the United States and in overseas theaters. Some of these anesthetists were Army trained, and others were members of the American Association of Nurse Anesthetists who had been appointed to the Army Nurse Corps. With the invasion of the European mainland and the push through the Pacific Islands toward Japan, the need for more trained nurse anesthetists became apparent. Accordingly, the Army launched a full blown training program. Between December, 1941, and December, 1945, approximately 600 Army nurses completed courses in anesthesiology in some 55 Army general hospitals throughout the United States. Overseas, abbreviated courses in anesthesiology were given nurses within earshot of battle.

Depending on the needs of the service, the course of training in anesthesiology for the Army nurse ranged from three to six months during the war.

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*Educational Consultant, Army Nurse Corps.

Although it was originally planned that the courses should be of six months' duration, in many instances the need for anesthetists became so acute that the courses had to be shortened and accelerated. Hospitals were receiving hundreds of casualties needing surgery, and nurse anesthetists had to be put in the field at the earliest possible date. Accordingly, the training program was not what the Army desired or considered sufficient. However, the supervision of the anesthesia service was well controlled, and every nurse anesthetist worked under either a medical officer or a trained nurse anesthetist.

The following example is cited to show the need for, and the shortage of, anesthetists in general hospitals operating in overseas theaters. In addition, it illustrates the high type of service that nurse anesthetists gave despite the fact that military emergencies limited the amount of training that they received.

During the intense-combat period in 1944, a 2,000 bed hospital in Italy was receiving an average of 400 battle casualties daily. Two years before, this hospital unit had gone overseas with four anesthetists. One of these was a registered anesthetist, and the others had received brief training in obstetric anesthesia in civilian institutions. While this unit was in Africa, it became evident that additional nurse anesthetists would be needed when the unit moved closer to the front lines. Consequently, a request was made that members of the general nursing staff volunteer for training in anesthesia. This training was only of three months' duration. At the end of that time, these volunteers were thrown into a situation in which 100 operations were being performed every 24 hours.

In this situation, it was obviously impossible to give a standard course in anesthesia to the nurse anesthetists. There were not enough hours in the day to care for the patients and at the same time provide for formal classroom instruction. However, this particular hospital had an excellent medical anesthetist, and he spent most of his time going from operating room to operating room to supervise these volunteer nurse anesthetists in giving anesthetics. In this hospital, over 5,000 anesthetics were given during a six months' period, and not one death or complication occurred as a result of the anesthesia.

During the war, the Army not only had to supplement the supply of nurse anesthetists but also had to make sure that anesthetists were available in all areas in which they were needed. The rapid and efficient transportation of a particular service to a particular area for a particular purpose could not be accomplished overnight. In order to meet military needs, personnel must be procured, equipped, trained, and transported well in advance of the time they are expected to function in their respective capacities. Thousands of nurses had to be assigned to installations in the United States and to hundreds of units that were shipped overseas. Because of the magnitude of the job, one can readily understand why some nurse anesthetists were misassigned. In World War II there may have been more anesthetists than were needed in some places, but nowhere did we fail to have anesthetists when they were needed. If there was a waste of medical facilities, it was an accident of war, the result of having to be prepared everywhere, at every moment, for every type of attack.

The experience of World War II clearly pointed to the advisability of being prepared by establishing schools of anesthesiology for the Army nurse. Moreover, the termination of the war did not mark the end of the need for nurse anesthetists in the Army. In February, 1947, when the Army course for anesthetists was instituted, there were about 52,000 soldier patients in Army hospitals throughout the world. Among the casualties of World War II were about 15,000 soldiers who sustained major amputations, more than 35,000 who were treated for conditions requiring neurosurgery, 1,500 who were blinded, and 1,900 paraplegics. At the time the Army training program in anesthesia for nurses was started, there were approximately 185 anesthetists serving approximately 225 Army hospitals. Most of these were Army-trained and reserve nurses. In 61 Army Air Force installations, the total number of anesthetists was 12, or 1 nurse anesthetist for every 5 hospital installations. The total number of Army nurses in the Army Air Forces is about 727. These comparative figures speak for themselves.

A brilliant testimony of the service record of the Army Medical Department and the Army nurse anesthetist is that approximately 96 per cent of those battle wounded who reached Army hospitals alive were saved, as compared with about 92 per cent in World War I. The nurse anesthetist, whether civilian or Army trained, did a magnificent job in the service.

SUMMARY

In the Army, the shortage of persons trained to give anesthetics, during, and in the aftermath of, the war, has been acute, and the Army has recognized the need for training nurses in this specialty.

The Army Nurse Corps is aware of the problems confronting the American Association of Nurse Anesthetists in building up the ranks of nurse anesthetists to satisfy the requirements of the medical profession in this country. The Army Nurse Corps also stands ready to assist in any way that it can.

SHOCK

(Continued from page 125)

the reactions of a patient under anesthesia, to evaluate his ability to withstand the shock and blood loss of an operation, and to recommend measures which will prevent shock or correct it with the least possible delay once it has been established. It is therefore of great importance that the anesthetist have a thorough understanding of the etiologic factors of shock, familiarity with its many manifestations, and complete knowledge of its present day treatment.

STRUCTURE STUDY

The Board of Trustees has asked the Planning Committee to study the "Report on the Structure of Organized Nursing." As nurses, we should all be interested in the plans as published in the *American Journal of Nursing* for October, 1946. For further literature and for workshop guides, you may write to the Joint Committee on the Structure of National Nursing Organizations, Rm. 201, 1790 Broadway, New York 19.

Lucy Richards
Chairman of the Board

ANESTHESIA: ART AS WELL AS SCIENCE

Malcolm Stevenson, M.D.*
Memphis, Tenn.

My reference to anesthesia as an art is complimentary, and in no way do I mean to discredit your profession. Medicine at best is not a true science, and you, as well as all the other persons in medical specialties, should strive for perfection based on sound scientific principles. My discussion is based on personal experience as a surgeon and as a patient as well. It is my experience as a surgical patient that qualifies me to speak of the personal element in the role of an anesthetist. Who would be in a better position to do so than a surgeon who has had a dozen or more major operations within 11 months? This is not said boastfully but rather to impress you with my sincerity and high regard and esteem for the nurse anesthetist.

Webster defines art as "the skill in performance acquired by experience, study and observation." In general, I should like to define the art of anesthesia as the application of the fundamental scientific knowledge of anesthesia with wisdom, skill, gentle care, understanding, and quick rational thinking followed by appropriate action.

As is true of surgery and medical therapeutics, a sound, thorough technic must be based on established facts and principles. Artistic personalities cannot replace science. If one of these elements must be deficient, for the sake of the patient and of your profession as well, let it be art. The two are not incompatible but are synergistic.

A sound workable understanding of gases and the other agents used in the field of anesthesia is essential. Needless to say, one must be so well acquainted with the materials at hand that their use becomes second nature. This must not be forgotten in our reference to art.

The art of anesthesia requires an understanding of the normal and altered physiology of the vital systems. In addition, there must also be an appreciation of cause and effect. The patient is vitally interested in the relief of pain, but he is also concerned about his safety. Usually the abolition of pain will be taken for granted. However, the patient does not always assume the procedure to be performed will be safe. With confidence in her ability, the anesthetist must give him the needed reassurance. Certain obligations to the family should be brought to your attention. Usually an explanation is due only to the husband, wife, or parents. Your remarks to them should be tactful, honest, and evasive when the occasion demands, yet comforting. No attempt should be made to discuss in detail the operation, diagnosis, or prognosis except to say that "the patient's condition is good," or that "the patient withstood the operation as well or better than expected and your doctor will be in soon to explain everything to you." This is a delicate situation

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Read before the Mid-South Post-Graduate Nurse Anesthetists Assembly, Memphis, Tenn., Feb. 12, 1947.

*Assistant in Surgery, University of Tennessee, and Attending Staff, Baptist, Methodist, and St. Joseph's Hospitals.

for the nurse anesthetist, and often the least she says, the better.

The self confidence which is so necessary to an anesthetist can be had only if she is more than a technician. Almost any orderly after a few simple instructions might, at a terrific risk, be able to manage a certain number of anesthetic administrations and keep the patient on the table. It is also true that such an individual might instil misplaced confidence or a general sense of false security.

The mechanics of anesthesia are comparatively simple. However, the overall duties and responsibilities are complicated and require the most exacting application of physiologic and pathologic principles.

One of our leading surgeons recently made the statement that he would prefer to have a mediocre surgeon and an excellent anesthetist than to have the situation reversed. He further stated that in his opinion most deaths in the operating room might have been prevented had the anesthetic been handled differently. You might also be interested in learning that he thinks "nurse anesthetists are here to stay," and that he holds you in the highest regard.

A good anesthetist has many qualities which must be well balanced. She must be sympathetic yet emotionally stable and act by reason. She must be able to give the administration of the anesthetic her undivided attention. While she is working, outside worries, concerns, and difficulties must be set aside. In short, she must keep her mind on the business at hand.

The anesthetist must possess those qualities necessary for quick observation. Early signs of deviation from the normal must be noted before heroic measures become necessary to stabilize the patient's condition or for his recovery. Intellectual honesty is necessary if the surgeon is to be advised when a patient in an unsatisfactory condition does not respond to the usual measures.

The relationship and responsibility of anesthetist to surgeon and patient are morally just as strong and heavy as those of the surgeon to the patient and the anesthetist. There must be mutual faith and trust such as are demonstrated in few if any other human relationships. Doubt and fear must not exist. At times surgeons are prone to demand the impossible. Further relaxation is often obtained with too much risk. The anesthetist must often be tactful yet firm. Co-operation between anesthetist and surgeon is essential. The surgeon may find it advisable to stop the operation for a few minutes in order to obtain proper relaxation safely. At times a radical change in technic of the anesthetic administration may be required, and a surgeon should not forget that the anesthetist works under pressure with him. Her responsibility is not so great as his, but it is great enough. At times the surgeon may be required to work with the patient less relaxed than he would choose. Also the anesthetist may occasionally have to deepen the anesthesia more than she would ordinarily consider expedient.

The anesthetist must be able to make adjustments with ease, speed, and dexterity as the need arises. It is pleasing to see her deliberate and meaningful movements just often enough, but not so often as to suggest confusion.

As in any profession dealing with people, a genuine, sincere love for humanity is essential to the anesthetist. My advice to any young nurse interested in specializing in anesthesia depends on whether she possesses this quality. If this is lacking, I discourage her. Does she carry out routine nursing procedures with speed and accuracy, or is she slow and indifferent? She should have a sense of humor, yet act with maturity and show evidence of judgment above the average. If she measures up to these requirements, and her record in the operating room and on other services has been above the average, I tell her to go into the field of anesthesia. She is advised to obtain further training in the operating room and the surgical wards and thereby learn more of the problems confronting the anesthetist. I would suggest more college work with possibly a degree in science and majors in physiology and psychology. This probably seems an unreasonably long period of training, but it contributes to proper maturity and a personality adequately trained and capable of dealing with and understanding people. This will be the nurse anesthetist who will conduct anesthesia as an art as well as a science.

The nurse anesthetist so trained will have the qualities of tact and will use good judgment in keeping the surgeon informed of the patient's condition. An alarmist attitude is undesirable, yet full appreciation of danger is needed. More undesirable than an alarmist attitude is a frivolous, carefree, irresponsible one. Any critical change in the patient's condition should be called to the attention of the surgeon. All surgeons want to know of any unusual change or sign of an approaching condition incompatible with survival. The surgeon wants to know before the condition is irrevocable. If the surgeon knows of an approaching event a few minutes beforehand, he may be able to terminate the procedure before the patient's condition is such that he can tolerate no more surgery.

By following the surgical procedure at hand and anticipating the surgeon's technic, the anesthetist will be able to adjust the depth of relaxation to the demands of the occasion. For example, five minutes before the surgeon palpates the liver and gallbladder through a lower abdominal incision, the patient is prepared with proper relaxation for the surgeon to resume operating in the lower abdomen.

If the anesthetist visits the patient in his room before the operation and tactfully answers questions about the anesthetic, explains the ease of induction, and the unlikelihood of nausea and vomiting, the patient will feel that he is among friends in the operating room. The idle chatter and unpleasant comments made by the patient's well meaning friends may be corrected by the anesthetist to put the patient more at ease. During such visits the patient's physical status and mental attitude may be evaluated and adjusted. The patient will look to the anesthetist as a protector and often take her into his confidence. Hope and peace of mind mean much to a person undergoing an operation. However, the anesthetist must be honest with the patient and promise only what is possible.

I believe that no one is better qualified to watch the patient during the immediate postoperative recovery period than the nurse anesthetist. I do not suggest that she take the place of a special duty nurse, but when the operation has been long and shock producing, the care the patient receives during the first few hours often means the difference between fatality and survival. The anesthetist has watched the patient's blood pressure, pulse, and so forth, during the operation and will be able to evaluate the situation and consult the surgeon for specific orders, as well as to aid in giving plasma, blood, oxygen, and other medication when needed. During her subsequent visits, she should make certain that specific orders are being executed, for example, routine exercise and deep breathing. It goes without saying that the nurse anesthetist will have little time left for duties other than those mentioned after spending most of the morning in the operating room.

The function and importance of the nurse anesthetist in the administration of local anesthetics is often overlooked. Whether it be spinal or caudal anesthesia or simple infiltration, her presence is essential. It is here that the "old personality" is called upon. I have seen nurse anesthetists who, I believe, could talk the patient out of pain. On the contrary, I have seen others who would insist on asking, "Isn't the doctor hurting you?" I do not wish to imply that the nurse anesthetist should be a master of hypnotism, yet it might be worth her consideration by some other name. Above all, the patient's physical needs must not be forgotten.

I would not go so far as to say that a good anesthetist must be born, yet blessed are they who possess the inherent gifts of intelligent observation, love of people, and rationalism. The nurse anesthetist must possess these qualities, whether they are inherent or acquired.

When sending changes of address to the Executive Office, association members should be sure to include the old as well as the new address, complete with postal zone number.

ANESTHESIA FOR CHILDREN

(Continued from page 130)

ist should accompany the baby to its room and see that oxygen is being properly given before she leaves. Because of the vigilance of our anesthetists, more than one child has been saved after the operation was completed and the baby was back in his crib. In case of doubt, if you give oxygen, you will be right a good percentage of the time.

Anesthetic deaths in routine cases are not common but do occur. I was very much interested in a statement made by Dr. Knight that the highest percentage of anesthetic deaths occur in a very simple and unfortunately too common operation — tonsillectomy. The anxious struggling child fights and breathes rapidly, thus eliminating carbon dioxide. The anesthetic agent is pushed too rapidly to overcome the struggling child and to make room for the endless patients for tonsillectomies to follow. Respiratory arrest occurs and is occasionally fatal. Preoperative administration of barbiturates will do much to quiet the child who is going to be unwillingly separated from his tonsils.

HOTEL RESERVATIONS FOR ANNUAL MEETING

Members planning to attend the annual meeting in St. Louis, Sept. 22-25, are reminded that they must file with the American Hospital Association Housing Bureau the form on page 112 of the May issue of the JOURNAL. For purposes of identification, each member attending the convention should take with her her 1947 membership card.

CO-ORDINATION OF EFFORT WITHIN THE DEPARTMENT OF ANESTHESIA

Esther Myers Stephenson, M.A.A.N.A.
Red Bank, N. J.

"Co-ordination of effort" implies the co-operation of a team of workers, each contributing his full share to the total effort to accomplish desired objectives. There must be a willingness to co-operate if the desired objectives are to be realized. Since we are dealing with human beings, each having his own peculiar characteristics and idiosyncrasies and all sharing similar reactions and urges in life, it is necessary to find a formula for willingness to co-operate. A department of anesthesia can function efficiently if all personnel have a willingness and even better a desire to co-operate and to do good work.

It is first necessary to consider the component parts of the formula and then the principles for working out the formula. The primary prerequisite for co-ordination of effort within a department of anesthesia is a good hospital with good departmental organization and management. From my experience, I believe that 95 per cent of all hospital administrators are convinced that they have good organization and management. Whereas the great majority of them do have a good organization on paper, I sincerely doubt that they have what one could call ideal management. Their intentions to execute all details are good, but the day does not seem to have enough hours for these intentions to be realized.

It is essential that there should be well defined hospital and departmental policies. It is not enough to have written policies. It is most important that these policies should be readily available to all hospital personnel and that they should be brought to their attention from time to time.

A lot is being said and written about the "right or healthy attitude." For an employee to have the right attitude when she accepts a job, she must be free from any doubts or fears about the position. Accordingly, the anesthetist should be given a clear picture of the position before she accepts it so that she will know exactly what is expected of her and what to expect of the hospital.

In analyzing the reasons for turnover among hospital personnel, including anesthetists, I find that this is one of them: Employees will say, "When I was employed, I was not told to do all of the things now expected of me." The fault lies with both the employee and the employer. In most cases the employee can get in writing, if she asks for it, a statement of the policies of the hospital and of the nature of her duties. The reason for not asking for such a written statement is usually timidity. My advice to anesthetists is that they completely understand the requirements of the position before accepting it, and my advice to hospital administrators is that they give the prospective employee

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Read before the New England Hospital Assembly, Boston, Mar. 25, 1947.

this information. When this procedure has been followed, the turn-over among anesthetists has fallen appreciably.

The type of hospital policies has a marked effect upon the attitude of the employee starting a new position. When policies are explained and the employee is not in doubt as to the effectiveness of any part of them, she will have a desire to co-operate in full measure. These policies must not be only paper policies but, to have a lasting effect on the employee, must be made alive in being carried out by a responsible person.

Just how these policies are effected depends largely upon the administration. The important thing is to have them carried out. At this point it is well to mention some of the things to be included in the policies of a hospital. They should include provisos concerning:

1. Specifications as to the qualifications of an anesthetist
2. Departmental job analysis
3. Annual health examination
4. Group insurance
5. Interdepartmental conferences
6. Vacations, sick leaves, promotions, dismissals, and salary
7. Leaves for study and attendance at local and national meetings of professional organizations

Before leaving the subject of policies, consideration should be given to departmental policies. Personnel directors find employees more disturbed by incidentals than by major issues. Accordingly, it is well to adopt, whenever possible, a departmental policy on such grievances. It is difficult to define what is to be done in all situations under all given conditions. Therefore, it is better to allow for flexibility. The person who works out the problems should likewise be understanding and flexible to prevent decisions' being colored by petty irritations and personalities. The written departmental policies should cover:

1. Objectives of the department
2. Paths of authority
3. Interdepartmental functions
4. Departmental procedures
5. Staff conferences
6. Records to be kept and reports to be submitted
7. Requisition and care of equipment and supplies
8. Duties and working hours of each staff member
9. Clothing worn on duty and personal appearance of staff members

In addition to fine policies, all well administered, there are two other considerations which contribute to bringing about a desire to co-operate with the end result, co-ordination of effort. These considerations are qualified personnel and incentives.

Just what is meant by qualified personnel? It means personnel well educated and skilled in the art of administering all kinds of anesthetic drugs by the accepted methods for all types of surgery. An administrator's evaluation of an applicant's education and skill depends on her credentials and performance.

It is wishful thinking to expect anesthetists or any other personnel to enjoy working with unqualified co-workers, especially if the qualified persons are in subordinate positions. During the past few years nurse anesthetists have been in great demand. With the demand exceeding the supply, many hospitals have been forced to lower their employment standards and to employ nurses who are not graduates of established schools of anesthesiology. In most instances qualified anesthetists have accepted this emergency measure and have even taught these nurses how to improve their technics.

In planning for the future and in looking forward to better departmental practices and co-ordination of effort, we must once again seek anesthetists qualified to do the work that surgery now demands. As a result of the effort of the armed forces to supply anesthetists for army and navy hospitals by giving short courses to both physicians and nurses, there are literally hundreds of anesthetists so trained seeking positions in civilian hospitals. Some have had excellent training and experience and are qualified for any position. The majority, however, are not. To employ them and particularly to put them in responsible positions over anesthetists who not only have excellent qualifications but also have done a superb job in giving anesthetics is to handicap the smooth running of the department. There are, however, exceptions depending on circumstances and personalities. Accordingly, to secure co-ordination of effort and to avoid another reason for turn-overs, hospitals should have high employment standards and aim to retain them.

The final consideration for co-ordination of effort within a department of anesthesia is incentives. It has been mentioned that little inconveniences and annoyances appear to be more disturbing than big issues. Listing the conditions which destroy the incentive to co-operate and to do good work may be emphasizing the negative instead of the positive aspect, but the teaching of DON'TS sometimes results in effective learning. Conditions which destroy incentive are:

1. Poor departmental understanding and relationships
2. Lack of opportunity to serve to one's fullest capacity
3. Either poor departmental procedures or lack of adherence to procedures
4. Inadequate or outdated equipment
5. Long hours with accompanying inconsiderations

Diplomats are needed not only in the political life of the nation but in every field of endeavor. Although a little diplomacy can do much to prevent or smooth out many disturbing situations, a number of issues cannot be so easily settled. The director or chief of the department of anesthesia has a great deal of responsibility. He or she, whichever it may be, must be the key coordinator of the co-ordinated effort. It is to this key person that staff anesthetists look for guidance and example. When personal glorification takes precedence over the over-all objectives of the department and the personnel as a whole, dissatisfaction will result. This situation does exist even though it may not be recognized by department heads or hospital administrators. It has become so noticeable that one is inclined to consider it a trend.

It manifests itself in many ways. Frequently, upon the employment of a new director of the department of anesthesia, staff anesthetists are no longer permitted to give certain anesthetics or to use some particular method which they have always found successful. This does not happen in isolated cases; it occurs frequently enough to be mentioned as one of the big destroyers of incentive. To be skilled in the technic of giving cyclopropane or pentothal sodium and not to be able to give these agents destroys interest in one's work.

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4. Inadequate or outdated equipment
5. Long hours with accompanying inconsiderations

Diplomats are needed not only in the political life of the nation but in every field of endeavor. Although a little diplomacy can do much to prevent or smooth out many disturbing situations, a number of issues cannot be so easily settled. The director or chief of the department of anesthesia has a great deal of responsibility. He or she, whichever it may be, must be the key coordinator of the co-ordinated effort. It is to this key person that staff anesthetists look for guidance and example. When personal glorification takes precedence over the over-all objectives of the department and the personnel as a whole, dissatisfaction will result. This situation does exist even though it may not be recognized by department heads or hospital administrators. It has become so noticeable that one is inclined to consider it a trend.

It manifests itself in many ways. Frequently, upon the employment of a new director of the department of anesthesia, staff anesthetists are no longer permitted to give certain anesthetics or to use some particular method which they have always found successful. This does not happen in isolated cases; it occurs frequently enough to be mentioned as one of the big destroyers of incentive. To be skilled in the technic of giving cyclopropane or pentothal sodium and not to be able to give these agents destroys interest in one's work.

In my opinion, it is not safe for a person to administer anesthetics and not be able to introduce an intratracheal catheter when necessary. Yet in some hospitals the departmental policy is to forbid intratracheal intubation by some of the staff anesthetists. This is a definite handicap to the administrator of the anesthetic.

In other instances, nurse anesthetists are called upon to perform procedures which they prefer not to perform, such as the administration of spinal anesthetics. It is true that laboratory technicians do spinal punctures, but until spinal anesthetics are given by nurse anesthetists generally, just as intravenous, inhalation, insufflation, and rectal anesthetics are, it is better not to expect her to handle this procedure. She is, nevertheless, well equipped to watch and care vigilantly for the patient after the drug has been given.

Every anesthetist has her own idea of good departmental procedures as they apply, for example, to the pre- and postoperative care of the patient and the care of the patient in the operating room under various conditions. However, unless departmental procedures are written and adhered to, discord will result. A situation which occurs in the best of hospitals and one that is constantly a source of unhappiness and a destroyer of incentive is the scheduling of more operations than the department of anesthesia can efficiently handle. This means that the anesthetist must rush from one case to another without seeing her patients to their rooms. Interdepartmental planning would prevent this.

Just as important as having anesthetists who are qualified is providing equipment adequate for the job to be done. If there is not enough equipment for every staff anesthetist, or if it is obsolete or in need of repair, it is impossible for the anesthetists to give good service to the patient, surgical team, and the hospital. A good worker deserves good tools. Without them she cannot have the highest incentives to do her best.

That incentive is destroyed by long hours with accompanying inconsiderations is self evident. It is likewise obvious that adequate financial remuneration is valuable as an incentive factor.

Personality also plays a part in the realization of co-ordinated effort within a department of anesthesia. We all know what one bad peach will do to a basket of peaches, and it is of paramount importance that misfits be encouraged to adjust or to find the position for which they are fitted. This can be done kindly, and one should remember that there is a special place for every one of us.

Finally, I wish to point out the importance of interdepartmental conferences in attaining our desired aim. Through the medium of these conferences, which provide an opportunity for the exchange of ideas and presentation of mutual problems, there will arise a feeling of good fellowship and *esprit de corps* that is priceless.

SUMMARY

For co-ordinated effort within the department of anesthesia, there must be: (1) a clear understanding of the hospital policies before an employee accepts a position; (2) good hospital and departmental policies and an effective plan for executing them; (3) qualified personnel; (4) an effort to eliminate or minimize the obstacles and handicaps that tend to destroy incentive; (5) interdepartmental conferences.

ANESTHESIA SERVICE IN THE SMALL HOSPITAL

Louise Schwarting, M.A.A.N.A.
Fort Dodge, Iowa

The federal program of liberal aid for the construction of small hospitals and the ambitious strivings of physicians in small communities for workshops in which they, personally, may care for their patients are increasing the number of small hospitals at the present time. This increase will become more rapid when the federal aid and building programs get fully under way. With this impetus given to the construction of community hospitals, attention needs to be focused on the staffing of this type of hospital, one aspect for consideration being the anesthesia service.

In small hospitals, minor operations and the more simple major operations are performed by the local physicians. For the more difficult types of major surgery, more experienced surgeons are called in from a larger nearby center. An encouraging sign is that, with the reduction of the medical corps of the armed forces to a peacetime basis, many well qualified physicians are establishing practices in small communities. As a result, in some of the larger community hospitals, surgery embraces all but the most difficult types of work, i.e., surgery of the brain and chest.

Physician anesthesiologists are too few to be found in small communities. In addition, the present shortage of nurse anesthetists makes it difficult, if not impossible, for small hospitals with an average of 50 to 75 patients needing anesthesia service each month to attract an anesthetist. The smallest community hospitals, consequently, are dependent upon local physicians and visiting nurse anesthetists for anesthesia service. One often finds local physicians giving anesthetics for each other—usually drop ether.

In hospitals of somewhat larger size, there is a demand for a more flexible anesthesia service, and staffs of two or three nurse anesthetists are maintained. The quality of the surgical service and the competence of the anesthetists determine what the service shall be. In hospitals where 200 or 300 anesthetics are administered each month, every anesthetic agent and technic are used. For these institutions, the supply of nurse anesthetists does not equal the demand. The number and quality of these hospitals competing for the too few anesthetists is increasing salaries and, incidentally, materially improving working conditions.

As is usual in large hospitals, inhalation therapy and resuscitation are part of the anesthesia service in the small hospital. If these additional activities are not sufficient to occupy fully the members of the anesthesia staff, they may be requested to supply and dispense drugs if a pharmacist is not employed.

The acquisition and care of anesthetic equipment fall within the province of the anesthetist in the small hospital. Every anesthetist who is qualified to use anesthetic equipment knows how to obtain the necessary items. The cost it not prohibitive if the initial purchases are limited to the bare essentials; these should be carefully selected. Then, as the need for additional equipment is demonstrated, it should be obtained without difficulty.

The cost of upkeep of equipment can also be kept to a minimum. The period of usefulness of rubber parts can be greatly lengthened if they are sterilized in solutions which do not produce deterioration and are stored in a cool dark place. The life of masks can be more than doubled if the inflatable rims which no longer hold air satisfactorily are filled with glycerin or a glycerin substitute (pliaba). Under the direction of the anesthetist, the hospital engineer can make a number of small accessories. Indeed his suggestions may greatly improve the article to be constructed.

The anesthetist in the small hospital has an opportunity to contribute to the development of the anesthesia service. The successful introduction of new methods depends upon her missionary zeal and the receptivity of the surgical staff. An interest in the anesthesia service on the part of the surgeons and hospital directors is highly desirable, and a spirit of co-operation in this group will result in worthwhile innovations. There is ample opportunity for discussions with the surgeons as well as for careful observation of the patient to improve clinical judgment. If the anesthetist takes an interest in pre- and postoperative care, sedation, ambulation, and biochemical and nutritional studies, the competence of the anesthesia service will be greatly increased.

To keep abreast of advances in anesthesiology, the anesthetist in the small hospital depends on opportunities to attend conventions, institutes—too few at present—, and clinics. She also needs to have access to the medical literature. In many states there are tax-supported medical libraries which may be used by anyone on the terms governing the use of all public libraries. From these libraries it is possible to obtain many books and journals containing articles on anesthesiology. This keeps a steady stream of new information coming in and prevents the anesthetist from settling down to a humdrum routine. The sole cost for this service is that of mailing and is usually borne by the hospital.

Living conditions and the food are often very good in the small hospital. With a staff of three anesthetists, hours can be arranged for the convenience of all, provided the pressure of work is not too great. In hospitals employing only one anesthetist, a physician may relieve her at stated intervals, or some arrangement may be made whereby she can always be reached by telephone. This is a fairly satisfactory practice since in hospitals where the total amount of work is small, the number of emergencies is likewise small. Social life in the small community is what the individual makes it. Although there is less commercial entertainment than in large cities, there is a greater likelihood of participation in community projects and personal friendships. Since the cost of living is relatively low, there is the possibility of saving a large percentage of one's income.

SUMMARY

With the impetus given to the construction of community hospitals by the federal aid program, there is an ever increasing need for competent anesthetists in small communities. The nurse anesthetist in the small hospital has an opportunity to contribute greatly to improvements in the anesthesia service and to live a pleasant and satisfactory professional and personal life.

CURRICULUM PLANNING FOR TOMORROW

Alma Webb, M.A.A.N.A.*
Texarkana, Tex.

The question has often been discussed as to how teaching in anesthesia can best prepare the anesthetist for her work and enable her to contribute her best effort to the field of anesthesia. The scientific and technical advances occurring in this field are making the specialty increasingly complex and have emphasized the need for certain changes in the curriculum for nurse anesthetists. An important consideration is what curricular content will meet the need—how much chemistry, anatomy, physiology, physics, psychology, and so forth, should an anesthetist know for the skilful administration of anesthetics, and what phases of these subjects should be emphasized.

In determining the curricular content, the first step is to visualize the anesthetist on the job and to find out all the things she does and all the problems she faces in carrying out her duties. At present the trend is toward a broadening of the anesthetist's duties to include an impressive array of activities. These may include not only the administration of anesthetics but the related care of the patient in the operating room, administrative responsibilities, and in some instances gas therapy as well. In addition to analyzing the duties of the anesthetist, it is necessary to ascertain the methods and technics that the well qualified anesthetist employs in carrying out these activities. To a great extent what the anesthetist is expected to do determines the construction of the curriculum; for the student must be prepared, during the course, to assume all the responsibilities attendant upon the modern practice of anesthesia.

A good curriculum should include the fundamental subject material demanded by the needs of the profession. The objectives are:

1. To train nurse anesthetists to become skilled in the administration of anesthetics.
2. To give the student anesthetist a sound scientific basis for her skills, so that the mastery of technics is correlated with an intelligent understanding of the scientific principles underlying the application of technics.
3. To give the student the knowledge that will equip her to make sound professional adjustments.

In the making of a curriculum, the subject material must be selected with a certain formality and cautiousness. As a consequence, essential misunderstandings may develop about the use of the curriculum. The formality with which the curriculum is set up should not imply that the curriculum should be adhered to without change. Such a misconception often leads to a disregard for the selection of appropriate practical procedures for the achievement of skills. It is true that certain topics and features must be in the curriculum for anesthetists if it is to fill the needs of the specialty. The curriculum must provide, in practice, for the intelligent acquisition and use of skills correlated with theoretical instruction. However, it is well to remember that advances in the science of anesthesia will necessitate changes in the curriculum from time to time. Moreover, allowances must be made for variations in the abilities and aptitudes of students. Consequently, the curriculum should be flexible enough to allow the instructor to make acceptable adjustments as they are necessitated by advances in anesthesiology and variations in the type of students coming into the school. It should in no way restrict the free selection of desirable learning activities by both students and teachers. The content of the curriculum, the length of the course, and the arrangement and sequence of the subject material are also influenced by the entrance requirements of the school, science pre-requisites, and the level of instruction in the school of anesthesiology itself.

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*Chairman, Curriculum Committee, American Association of Nurse Anesthetists.

The sources of material used in the selection of subject material for the curriculum should represent the viewpoint of specialists in the field of anesthesia and instructors and directors in the schools of anesthesiology. These sources of material for teaching are available in courses of study, school curriculums, study outlines, syllabuses, lesson plans, textbooks, and scientific magazines. Through an analysis of these sources, an estimate may be made of the knowledge, skills, and attitudes which the anesthetist must acquire through her training and of the general trend the education of the anesthetist should take.

As a basis for any presentation of the fundamental subject material on anesthesia, it is essential that the student should have an adequate background in the sciences related to anesthesia. These related sciences of anatomy, physiology, physics, and chemistry furnish principles which the student must learn and apply if the methods of administration of anesthetics are to be understood.

A good scientific background is not an end to itself but should be correlated with its practical application; for many of the scientific principles from the related sciences are applied in procedures followed in anesthesia. These principles serve as a foundation, supporting and re-enforcing the fundamental subject material on anesthesia. Then, class instruction in the technics of anesthesia, the administration and pharmacology of various anesthetic agents, and anesthesia for various types of patients needs to be carefully correlated with clinical experience. In this way, the student develops an understanding of the specialty of anesthesia, the needs of the specialty, and the trend her professional training is taking.

In the curriculum, this correlation of theory and practice is effected by provision for the right kind and amount of practice in giving anesthetics. The student learns by doing, and she acts intelligently when she has the theoretical knowledge to give purpose to her action and the manner in which she performs her duties.

During her training period, each student should have an opportunity to develop a system for planning the anesthesia for each patient. Such a plan should include:

1. Careful consideration of the physical and psychic needs of the patient.
2. Consideration of the patient's condition and the principles of the patient's care related to the duties of the anesthetist.
3. Consideration of the effect of the anesthesia on the patient's condition and its relationship to the skilful administration of anesthetic drugs, the intelligent observation and interpretation of significant

CALENDAR OF COMING EVENTS

September 17	**Illinois Association of Nurse Anesthetists, 35 W. Randolph St., Chicago**
September 20-21	**Schools of Anesthesiology Assembly, St. Louis**
September 22-25	**ANNUAL CONVENTION, AMERICAN ASSOCIATION OF NURSE ANESTHETISTS, St. Louis**
November 8	**Anniversary Meeting, Michigan State Association of Nurse Anesthetists**
April 28-29	**Annual Meeting, Pennsylvania State Association of Nurse Anesthetists, Bellevue Stratford Hotel, Philadelphia**

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symptoms, and the indications and contraindications for the use of anesthetic drugs.

In the curriculum, provision should be made for a graduation from the use of simple introductory procedures and technics until the student has a maximal skill in the administration of anesthetics and the handling of emergencies.

The final objective of a curriculum for nurse anesthetists is to educate the student to fulfill her professional objectives and participate in the group life of the hospital. The subject material on professional relations includes history of anesthesia, ethics and professional problems, applied psychology, and the organization and management of a department of anesthesia. Familiarity with this subject material makes the student aware of her place in the group and of the value of group action. In this phase of her training, the student learns methods of co-operation with allied professional groups. It is becoming increasingly important for the anesthetist to know how to share in the activities of her own group in order that group plans may be effectively realized. Therefore this part of the curriculum should be strengthened and closely correlated with clinical experience.

SUMMARY

By anticipating the trend of advances in the science of anesthesiology today, it is possible to plan a curriculum to prepare the student to meet her responsibilities as a nurse anesthetist of tomorrow. A sound background in the basic sciences and the theory of anesthetic administration must be correlated in every phase of the student's training with practical experience, gained in a professional manner and applied with professional understanding.

ANESTHESIA IN OBSTETRICS

(Continued from page 137)

difficult and uncertain, and the presence of any infection in the area of injection; (2) the method must be executed by somebody specifically trained in this technic, and such a person must be present during the entire anesthetic procedure. Today, the method of caudal anesthesia is slowly settling into its apportioned place as one of the various methods and agents of the armamentarium of the anesthesiologist.

SUMMARY

Almost every drug that has been found to possess pain-relieving properties has been used at one time or another in obstetrics. But the day of the panacea is not yet in sight. This still challenges the chemist, the pharmacologist, the obstetrician, and the anesthetist, who must unite in their efforts to control the pain of childbirth safely.

THE QUALIFYING EXAMINATION: A STANDARD OF THE ASSOCIATION

Janet McMahon, M.A.A.N.A.*
Cleveland

Since the examination program of the American Association of Nurse Anesthetists went into effect with the administration of the first qualifying examination in June, 1945, its objectives and its relationship to the schools of anesthesia have been subject to a variety of misinterpretations. That misunderstanding should exist is probably natural since it is not yet customary for the professional organizations which represent the specialist groups in nursing to use admission by examination as a requirement for membership. A comparison of current trends in the nursing field with developments in the field of medicine may help to clarify the purpose of our examination program.

A natural outgrowth of the widening scope of the field of medicine was the development of specialization. Specialization, in turn, led to the formation of associations of specialists. Because medicine is a registered profession in which the passing of an examination to establish proof of competency is required by law, it was not necessary for the parent professional association to make admission by examination a requirement for membership. The state, however, does not regulate the standards of a medical specialty, so it became customary for the specialty organizations in medicine to use examinations as an admission requirement.

The use of examinations for such purposes derives logically from an association's desire to maintain its standards. Since the prestige of a professional association depends upon the competence of its members, it must have some means of gaging the fitness of candidates for membership. The establishment of standards for education and experience is not enough, since they do not necessarily guarantee the quality of education and experience. Nor is the record of an individual's education always a reliable index of the knowledge he possesses. There is, however, one accepted method of determining knowledge. That is the examination. It is not a perfect instrument of measurement, but when used in conjunction with other methods of evaluating a person's qualifications, it gives a professional organization additional assurance that a candidate for membership meets the organization's standards.

In order to become a member of a medical specialist organization, a physician must have passed the licensing examination required of all physicians and, in addition, the examination of the specialty organization. The first examination is required by law to establish proof of competency to practice in the general field of medicine; the second examination is required only by the specialty organization itself to establish proof of the physician's competence in the medical specialty and thus to protect the standards of the association.

It was inevitable that the growth of the field of medicine should result in the expansion of such a closely related field as nursing. As the scope of the nursing profession has been extended, it has also been characterized by a similar trend toward specialization with the subsequent development of specialty organizations. There are as yet relatively few associations of specialists in the nursing field, but an increase in the number of such associations can be expected as the tendency to specialize becomes more general.

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*Chairman, Examination Committee, American Association of Nurse Anesthetists.

To my knowledge, our association is the first of the specialty organizations in nursing to use an examination as an admission requirement. It is interesting to note, however, that other nursing organizations are considering the adoption of this policy. In the plans for the reorganization of the professional nursing associations mentioned in the "Report on the Structure of Organized Nursing,"[1] admission by examination is advocated as a requirement for membership in the parent nursing organization, with an additional examination being required for admission to a specialty association.

In instituting the policy of admitting candidates by examination, the American Association of Nurse Anesthetists was prompted by the same motive which led to the use of examinations by the medical specialty organizations—the desire to maintain its standards by further insuring the competency of its members. The qualifying examination is given for the purpose of determining whether or not a candidate possesses sufficient knowledge of anesthesia to meet the requirements for membership. Its sole objective, therefore, is the protection of the standards of the Association.

If this purpose is understood, there should be no confusion concerning the status of the candidate who has passed the examination. That certain misconceptions are current is evidenced by two phrases in common use, i.e., "registered nurse anesthetist" and "national board examination." The first implies that passing the qualifying examination confers registration on the anesthetist, and the second suggests that the qualifying examination is comparable to the state board examinations for nurses. Passing the qualifying examination does not mean that the anesthetist is then *registered, licensed,* or *certified.* It means only that she has met one of the qualifications for membership in the American Association of Nurse Anesthetists. The term "registered nurse anesthetist" is probably a natural expansion of the term "registered nurse"; the latter is legitimate, but the former is not. Since the term "Qualifying Examinaion for Membership" aptly expresses the purpose of the examination, some of these misconceptions could be avoided by using its correct name instead of the term "national board" whenever reference is made to the examination.

By way of definition, the qualifying examination is a standards-enforcement examination. According to R. Louise McManus,[2] "A standards-enforcement test seeks to determine whether the student or candidate meets or does not meet a certain known and accepted standard." A standards-enforcement test differs from an educational guidance test in that it is concerned not with determining the *extent* of an individual's achievement, but only with determining whether the candidate knows *enough* to meet a certain standard. It is apparent then that the qualifying examination is not designed to teach anesthetists and should not be regarded as a teaching device, or as a "school project." Since it is, however, an educational standard of the Association, it will undoubtedly exert a profound influence on the education of the nurse anesthetist. It is, therefore, important that the relationship between the educational standards of the Association and the schools of anesthesia be clearly understood.

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[1] Raymond Rich Associates: Report on the structure of organized nursing, Am. J. Nursing 46:648-661, Oct., 1946.

[2] McManus, R. Louise: Study Guide on Evaluation (New York: National League of Nursing Education, 1944).

It is not the function of a professional association to undertake the education of the future members of the profession. Education is the business of educational institutions. Nevertheless, because of the professional association's interest in fostering the advancement of its professional service, it is vitally concerned with the quality of the education which its future members receive. A profession's interest in the advancement of the professional service and its assumption of responsibility for the quality of service rendered by its practitioners are undoubtedly altruistic in nature, but also have a practical basis. For, if the quality of service is not improved and modified to meet the changing needs of society, society eventually imposes regulations upon the profession or the demand for the service ceases. It is self evident that the quality of service which the members of a profession render is dependent upon the quality of the professional education. It is, therefore, the responsibility of the professional association to set standards which will result in the continual improvement of the professional education of its future members.

Since the educational institution's existence is dependent upon the continued existence of the profession, it has an equal interest in the welfare of the profession and profits equally from the improvement of standards. Any enterprise directed toward the improvement of the professional service must, therefore, be considered as a co-operative effort in which both the professional association and the educational institution recognize and accept their share of responsibility: the responsibility of the professional association being to set the standards which encourage advancement of the professional service, and that of the schools being to prepare individuals who are capable of rendering competent service and of contributing to the advancement of the service.

By stimulating the schools of anesthesia to re-evaluate their teaching programs, the qualifying examination has already proved an invaluable aid in the improvement of education for nurse anesthetists. Its influence has been a positive one and will remain so provided that we do not lose sight of the fact that the examination is simply a means to an end. There is always danger that teachers will tend to overemphasize the examination itself and will come to regard passing the examination as the primary goal their students should attain. It is the responsibility of the teachers in the schools of anesthesia to keep constantly in mind that the fundamental objective of a school of anesthesia for nurses is to prepare efficient nurse anesthetists. If a school of anesthesia achieves this objective, then the qualifying examination will be simply an intersting challenge which the graduates of the school can feel confident of meeting.

NOTES AND THE NEWS

PROGRAM

FOURTEENTH ANNUAL CONVENTION
AMERICAN ASSOCIATION OF NURSE ANESTHETISTS
ST. LOUIS

SEPTEMBER 22-25, 1947

Held in Conjunction with the American Hospital Association Convention
Hotel Headquarters—Hotel DeSoto

The Business Meeting and all General Sessions will be held in
Municipal Auditorium, Meeting Room B

Exhibition Hall—Municipal Auditorium

Monday, September 22

9:00 a.m.—12 Noon Registration—Municipal Auditorium

2:00 p.m. General Session
Room B
Marie Brown, presiding

Address of Welcome
  Lucy Richards, President, A.A.N.A.

Greetings from the American Hospital Association

"Trends in Anesthesia as Indicated by a Large Sampling of the Literature"
  Florence McQuillen, Mayo Clinic, Rochester, Minn.

Panel Discussion
  Alma Webb, Texarkana Hospital, Texarkana, Tex.
  Janet McMahon, University Hospitals, Cleveland
  Helen Lamb, Barnes Hospital, St. Louis

Tuesday, September 23

9:00 a.m. Business Session

Room B

11:00 A.M. Council Session

Meeting open to all members of the A.A.N.A.
State officers, past and present, are urged to attend.

2:00 P.M. Business Session

Room B

Wednesday, September 24

General Session

Room B

Marie N. Bader, presiding

9:00 A.M. "Anesthesia for Plastic Surgery"
James Barrett Brown, M.D., Associate Professor of Clinical Surgery, Washington University, St. Louis

10:30 A.M. "Personnel Relationships"
Frank Bradley, M.D., Barnes Hospital, St. Louis

General Session

Room B

Jessie Compton, presiding

2:00 P.M. Subject and speaker to be announced.

2:45 P.M. Subject and speaker to be announced.

4:00 P.M. "Fluid Replacement during Operative Procedures"
Frank Walton, M.D., Associate Professor of Surgery, Washington University, St. Louis

7:00 P.M. Banquet
Grand Ball Room
Hotel DeSoto

Address: Arthur C. Horrocks, Goodyear Tire and Rubber Co., Akron, Ohio

Thursday, September 25

General Session

Room B

Gertrude Troster, presiding

9:00 A.M. "Anesthesia for Upper Abdominal Surgery"
Eugene Bricker, M.D., Associate Professor of Clinical Surgery, Washington University, St. Louis

9:45 A.M. "Effects of Anesthesia on Infants and Aged Patients"
Peter Heinbecker, M.D., Associate Professor of Clinical Surgery, Washington University, St. Louis

10:30 A.M. "Anesthesia for Chest Surgery"
Lenore Gribble, Henry Ford Hospital, Detroit

11:15 A.M. Subject and speaker to be announced.

General Session
Room B
Verna Bean, presiding

2:00 P.M. "The Psychosomatic Element"
Edwin Gildea, M.D., Head of Department of Neuropsychiatry, Washington University, St. Louis

2:45 P.M. "Anesthesia Service in the Small Hospital"
Harriet L. Aberg, Cottage Hospital, Galesburg, Ill.

3:30 P.M. "The Internist Looks at Anesthesia"
William Barry Wood, Jr., M.D., Busch Professor of Medicine, Washington University, St. Louis

SCHOOLS OF ANESTHESIOLOGY ASSEMBLY
ST. LOUIS

SEPTEMBER 20-21, 1947

The Schools of Anesthesiology Assembly was created by the Board of Trustees of the A.A.N.A. to provide a time and a place for representatives of the schools of anesthesia and the members of the Board of Trustees and of various committees of the A.A.N.A. to meet, discuss problems, and make recommendations to further the educational standards of our association. In so doing, it affords an opportunity for schools to help each other and for leaders in the field of education to help the schools. The time most suitable for the school directors has been found to be just prior to the annual meeting of the A.A.N.A. A director and assistant director were appointed by the Board of Trustees to conduct a two day program from the topics recommended by the various committees and directors of the schools of anesthesia.

This year's two day meeting will be held on the 15th floor of the DeSoto Hotel in St. Louis, Saturday and Sunday, Sept. 20-21. The sessions will be from 8 A.M. until 12 noon and from 1:30 P.M. until 5 P.M.

Closed session: The Saturday meeting will be open only to directors of schools of anesthesia or their appointed representatives.

Open session: Every member of the A.A.N.A. is welcome to attend the Sunday meeting. Those present last year were well oriented into the problems and functions of schools and into the educational standards the A.A.N.A. is seeking to establish.

The interest manifested by some of the anesthetists resulted in many of them going into schools of anesthesia as supervisors and teachers. There is still a demand for staff anesthetists in schools, and it is hoped that from this year's meeting more anesthetists will be interested in teaching positions.

Saturday, September 20

8 A.M.—5 P.M. At this closed session, the Education Committee will present for discussion subjects directly related to problems and practices in the schools of anesthesia.

Sunday, September 21

8 A.M.—12 noon "Principles of Test Construction"
A. R. Gilliland, Ph.D.
Northwestern University, Evanston, Ill.

"Statistical Methods of Scoring Examinations"
Sister Helen Marie, Director, School of Anesthesia
Mount Carmel Mercy Hospital, Detroit

"Report on the Fourth and Fifth Qualifying Examinations"
Janet McManon, Educational Director, School of Anesthesia
University Hospitals, Cleveland

1:30 P.M.—5 P.M. "How to Use a Curriculum Guide"
Speaker to be announced.

"Faculty Preparation"
Frances Kocklauner
City Hospital, Cleveland

"Method of Setting up a Classroom Schedule"
Esther Myers Stephenson, Director, Schools of Anesthesiology Assembly
Red Bank, N. J.

Other topics of interest to schools.

NOMINATIONS FOR OFFICERS AMERICAN ASSOCIATION OF NURSE ANESTHETISTS

1947-48

At the annual meeting in St. Louis, Sept. 22-25, the following ballot of candidates for office in the American Association of Nurse Anesthetists will be submitted to the membership.

President

Lucy E. Richards (Cleveland, Ohio): Graduate of Salem Hospital School of Nursing, Salem, Mass.; graduate of Lakeside School of Anesthesia, Cleveland; past president, Ohio State Association of Nurse Anesthetists; member, Board of Trustees, A.A.N.A.; chairman, Credentials Committee, A.A.N.A., five years; president, A.A.N.A., eligible for re-election.

1st Vice President

Myra VanArsdale (Cleveland, Ohio): Graduate of St. John's School of Nursing, Cleveland; graduate of Lakeside School of Anesthesia, Cleveland; past president, Alumnae Association, Lakeside School of Anesthesia; former member, Credentials Committee, Ohio State Association of Nurse Anesthetists; chairman, Credentials Committee, A.A.N.A.; member, Board of Trustees, A.A.N.A.; chairman, Trust Fund Committee, A.A.N.A.; member, Finance Committee, A.A.N.A.; 1st vice president, A.A.N.A., eligible for re-election.

2nd Vice President

Mabel Courtney (Detroit, Mich.): Graduate of Grace Hospital School of Nursing, Detroit; graduate of Grace Hospital School of Anesthesia, Detroit; past president, Grace Hospital Nursing Alumnae Association, Federation of Catholic Nurses, Michigan Association of Nurse Anesthetists; chairman, Educational and Publicity Committees, Grace Hospital School of Anesthesia Alumnae; member, Postwar Planning Committee, A.A.N.A.; assistant director, Grace Hospital School of Anesthesia; former member, Board of Trustees, Michigan Association of Nurse Anesthetists; member, Board of Trustees, A.A.N.A.; chairman, Education Committee, A.A.N.A.

Treasurer

Gertrude L. Fife (Cleveland, Ohio): Graduate of Lakeside School of Anesthesia, Cleveland; director, Lakeside School of Anesthesia, 1934-46; charter member, A.A.N.A.; honorary member, A.A.N.A.; second president, A.A.N.A.; editor of *Bulletin*, A.A.N.A., 1933-44; treasurer, A.A.N.A., 1935 to present time.

Trustees

Three to be elected

Major Edith A. Aynes (Berkeley, Calif.): University of California, two years; graduate of Presbyterian Hospital School of Nursing, Denver; postgraduate work in orthopedics and operating room technic, New York; graduate of School of Anesthesia, Jewish Hospital, Philadelphia; Army Nurse Corps, 12½ years; chief, Technical Information Branch, Army Nurse Corps, SGO; Author's League; San Francisco Advertising Club; American Council on Public Relations.

Lillian Baird (Ann Arbor, Mich.): Graduate of University of Michigan School of Nursing, Ann Arbor; graduate of University of Michigan School of Anesthesia, Ann Arbor; director, School of Anesthesia, University of Michigan; past president, Michigan Association of Nurse Anesthetists; former member, Board of Trustees, Michigan Association of Nurse Anesthetists.

Verna E. Bean (Brooklyn, N.Y.): Graduate of St. Elizabeth's Hospital, School of Nursing, Boston; graduate of Long Island College Hospital School of Anesthesia; Army Nurse Corps, three and one-half years; established anesthesia departments and taught anesthesia in 79th and 117th General Hospitals; charter member, New York Association of Nurse Anesthetists; former member, Board of Trustees, New York Association of Nurse Anesthetists; president, New York Association of Nurse Anesthetists.

Mrs. Cleo D. Bopp (Oakland, Calif.): Graduate of Gartley-Ramsey Hospital School of Nursing, Memphis, Tenn.; graduate of Lakeside School of Anesthesia, Cleveland; anesthesia in Spain with Dr. Leo Elloesser, dean of surgery, Stanford University, 1937-38; former secretary-treasurer, California Association of Nurse Anesthetists; trustee, California Association of Nurse Anesthetists.

Josephine Bunch (Portland, Ore.): Graduate of Sacred Heart School of Nursing, Spokane, Wash.; postgraduate work in surgery; Washington State College, one year; graduate of St. Vincent's School of Anesthesia, Portland, Ore.; editor of first *Onagram* in Oregon; past president, Oregon Association of Nurse Anesthetists; former treasurer, Oregon Association of Nurse Anesthetists; former member, Revisions Committee, A.A.N.A.; chairman, Advisory Board, Oregon Association of Nurse Anesthetists; chairman, Agreements Committee, Oregon Association of Nurse Anesthetists; chairman, Western States Assembly of Nurse Anesthetists.

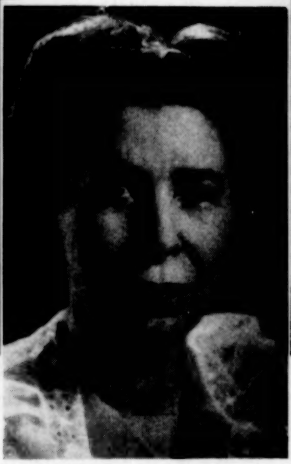
Billie Caraway (Atlanta, Ga.): Graduate of Protestant Hospital School of Nursing, Ft. Worth, Tex.; graduate of Washington Park Hospital School of Anesthesia, Chicago; former member, Board of Trustees, Georgia Association of Nurse Anesthetists; past president, Southeastern Assembly of Nurse Anesthetists; past vice president, Southeastern Assembly of Nurse Anesthetists; Nominating Committee, A.A.N.A.

Eva MacArthur (Brookline, Mass.): Graduate of Somerville Hospital School of Nursing, Somerville, Mass.; graduate of Lakeside School of Anesthesia, Cleveland; Boston University, Boston; former secretary-treasurer, Massachusetts Association of Nurse Anesthetists; president, Massachusetts Association of Nurse Anesthetists.

Julo Slattendale (San Diego, Calif.): Graduate of University of Minnesota School of Nursing, Minneapolis; graduate of University of Minnesota School of Anesthesia; taught and supervised student anesthetists at University Hospital, Minneapolis; former secretary, Minnesota Association of Nurse Anesthetists; former chairman, Program Committee, California Association of Nurse Anesthetists; Army Nurse Corps, two and one-half years.

Gertrude A. Troster (Memphis, Tenn.): Graduate of Baptist Memorial Hospital School of Nursing, Memphis, Tenn.; graduate of Lakeside School of Anesthesia, Cleveland; past president, Tennessee Association of Nurse Anesthetists; past 2nd vice president, A.A.N.A.; former member, Publishing and Nominating Committees, A.A.N.A.

EDITH A. AYNES



LILLIAN BAIRD

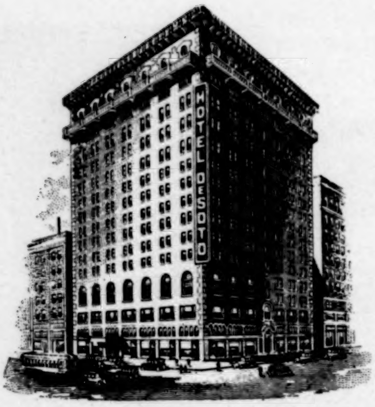
VERNA E. BEAN

JOSEPHINE BUNCH

BILLIE CARAWAY

GERTRUDE A. TROSTER

NOMINEES FOR TRUSTEES, A.A.N.A., 1947-48



THE CONVENTION CITY: St. Louis is the largest city in the West Central States and lies on the west bank of the Mississippi River, 20 miles south of the junction of the Mississippi and the Missouri. At this site there are two limestone terraces about two miles long, the lowest being about 20 feet above the river and out of the reach of floods. Here in 1764 Pierre Liqueste Laclède established a trading post for the Louisiana Fur Company, and until 1840 the fur trade was the town's chief activity. The growth of St. Louis was greatly influenced by the steamboat trade; in 1845, 2,050 steamboats docked at this river town. Today as a material evidence of progress, boat rides on the river are offered with all the comforts of air conditioning.

The Eads Bridge across the Mississippi accommodates more freight cars than any other bridge in the world. Pouring out of the city over 19 main trunk lines is the produce of its meat-packing houses, motor vehicle factories, petroleum refining plants, chemical plants, malt liquor establishments, boot and shoe factories, electrical machinery plants, publishing companies, and "tobacco, chewing and smoking and snuff" factories.

Of cultural interest to visitors in St. Louis are the Botanical Gardens, the zoo, and a municipal open air theater with a seating capacity of 10,000. The City Art Museum in Forest Park is a municipally owned museum established in 1912. On the outskirts of the city, one may visit the old U. S. Grant log cabin, built by Grant himself. At the Jefferson Barracks in St. Louis, both Lee and Grant served as generals.

Two of the nation's great universities are located in St. Louis, St. Louis University and Washington University. The internationally known medical department of Washington University grew by the merger of Missouri Medical College, Marion Sims College of Medicine, and Beaumont Hospital Medical College.

The history of medicine in St. Louis dates back to the founding of the town as a trading post, when a Frenchman, André Auguste Condé, practiced there as a surgeon. The first hospital was established in 1828 by some Sisters of Charity on ground donated by a Mr. John Mullanply. It was lodged in a log house of two rooms and a kitchen and was finished just in time to care for the victims of a cholera epidemic. In 1843 this hospital was incorporated as the St. Louis Hospital Association. Three years later the first city hospital was opened. It was totally destroyed by fire in 1856 and again by tornado in 1896. All told there are 33 hospitals in the city with a total of 12,087 beds.

Prominent on the skyline of St. Louis are the Bell Telephone Bldg., Civil Court Bldg., Continental Bldg., Missouri Pacific Bldg., the Railway Exchange, and Park Plaza Hotel. The St. Louis Cathedral is the only all mosaic cathedral on the continent.

COMBINED ANESTHESIA FOR THORACIC OPERATIONS.—When the surgeons at our hospital began to do thoracic surgery, I was told that "Without cyclopropane anesthesia, intrathoracic operations cannot be done." That this is not absolutely true is shown by the good results we have obtained with the following technic:

As soon as the patient reaches the operating room, venesection is performed at his ankle so that intravenous fluids and whole blood may be continuously administered. The throat is then cocainized in preparation for intratracheal intubation. This procedure encourages the patient to cough up and expectorate any secretions that may have accumulated in the respiratory passages. A needle is then inserted into a vein, and the patient is anesthetized with pentothal sodium. (Should venipuncture prove difficult, the anesthetic may be injected into the venoclysis tubing at the ankle.) When the patient is fully anesthetized, the intratracheal tube is inserted. To prevent the patient from biting on the rubber tubing, a 2 in. bakelite tubing, covered with a few layers of gauze bandage, is slipped over the intratracheal tube and held in place between the teeth. To keep the intratracheal tube in place, a safety pin is inserted into its walls and attached to a piece of adhesive tape fastened to the patient's chin.

The needle used for administration of the anesthetic is then removed, and the patient is placed on the frame of the operating table. While the assistants adjust his position, the anesthetist applies the mask of the anesthesia machine and fastens it securely. The mixture of the gases administered is from 50 to 70 per cent nitrous oxide with 50 to 30 per cent oxygen. The blood pressure cuff is applied to the patient's arm. The apparatus for administration of pentothal sodium is replaced, and the needle re-inserted if this can be done conveniently; otherwise, additional doses of the anesthetic are injected through the venoclysis tubing.

At the beginning of the operation, the surgeon infiltrates the skin and subcutaneous tissues, along the line of the incision, with procaine solution. When the anesthetist finds that the patient requires larger doses of pentothal sodium, she begins the administration of intocostrin intramuscularly, 2 cc. as the first dose, when the skin incision is made. Smaller doses are repeated at intervals of 1-1½ hours. The gas machine is kept at zero pressure until the chest is opened. It is then set at 3-5 mm. Hg pressure, as indicated. This pressure is slightly increased for re-inflation of the remaining parts of the lung before closure. A fall in blood pressure, while the surgeon is working on the lung, is controlled by increasing the rate of intravenous administration of fluids, by replacing the blood lost, and by injections of methedrine, should this be necessary.

In our hospital the intrathoracic operations require from five to seven hours of anesthesia. The largest amount of pentothal sodium is used before the pleura is opened. The highest total dose given has been 144 cc. of a 2½ per cent solution. The patient was fully awake when he was returned to his room.

The patients usually have completely recovered from the anesthesia on leaving the operating room. They experience no nausea or vomiting and are surprisingly comfortable after such long operative procedures.

Sr. M. Bonosa
Sacred Heart Hospital School of Anesthesiology
Allentown, Pa.

Nitrous Oxide-Oxygen and Curare Anesthesia for Nailing of Hip.—Since fractures of the head of the femur frequently occur in old people, the age factor needs special consideration. We have found that aged people do not tolerate pentothal sodium very well. Spinal anesthesia is more suitable, but difficulties quite often arise in doing a lumbar puncture. We have obtained fine results in such cases with a combination of nitrous oxide-oxygen and curare. The following case report is cited as an example:

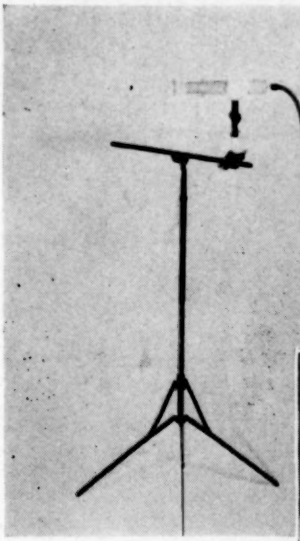
A white woman, aged 85, with a fracture of the head of the femur, was anesthetized with nitrous oxide 80 per cent and oxygen 20 per cent. Soon after induction, 2 cc. intocostrin was given. Because the patient still exhibited resistance in her extremities, a second dose of 1.5 cc. intocostrin was administered about five minutes after the first dose. The patient then began to relax, so much so that the insertion of an airway was necessary. The mixture of nitrous oxide-oxygen was maintained at a 50-50 per cent concentration. The patient's condition was fine throughout the operation, the surgical procedure requiring approximately an hour and fifteen minutes. When the mask was removed from her face, she recovered from the anesthesia and was able to answer simple questions on leaving the operating room.

Sr. M. Bonosa
Sacred Heart Hospital School of Anesthesiology
Allentown, Pa.

From the Editor.—We are lifting a memo from Cedric Adams' column in the *Minneapolis Star,* clipped for us by Florence McQuillen of Mayo's. What it says about news might well be said about writing of any kind, and for that reason it is being passed on to you. "It is my duty to see that they (the readers) get the truth; but that's not enough. I've got to put it before them briefly so they'll read it, clearly so they'll understand it, forcibly so they'll appreciate it, picturesquely so they'll remember it, and above all, accurately, so they may be guided by the light."

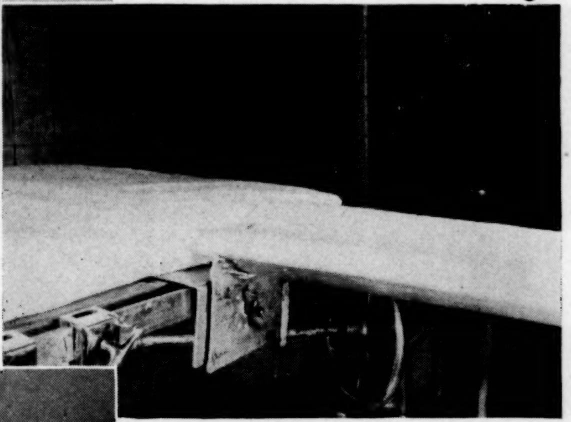
The nurses of the world took over the Atlantic City Convention Hall, May 11-16, for an impressive series of meetings. The report of this Congress of the International Council of Nurses was published in the July issue of the *American Journal of Nursing.* From the sideline of the A.A.N.A. booth, we collected some data about the status and the problems of nurse anesthetists abroad. Working through the "an--ee'-es-the-tists" and "la-bo'r-a-tories" of our British visitors, we learned that nurses in the British Isles have no formal training in anesthesia. A physician holds a certificate as an anesthetist after three years of training at the level of medical school training in this country. If nurses give anesthetics at all, they usually do so under the direction of a physician anesthetist. However, in both Canada and the British Isles, midwives and nurses are permitted to give anesthetics to obstetric patients, usually ether. In France the nurse anesthetist, who has a fairly well defined status, is not employed by a hospital, as is usual here, but is employed directly by a physician. She is trained by him and goes with him from hospital to hospital

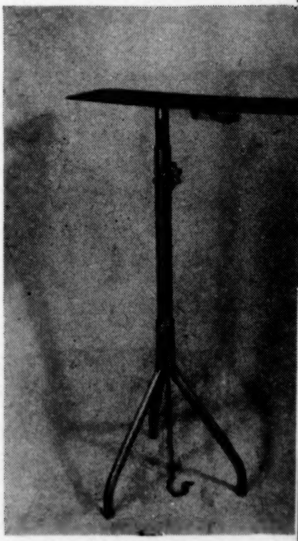
HOMEMADE OPERATING ROOM EQUIPMENT USED AT THE GRACE HOSPITAL, DETROIT.



Left: Folding music stand adapted as portable holder for pentothal sodium.

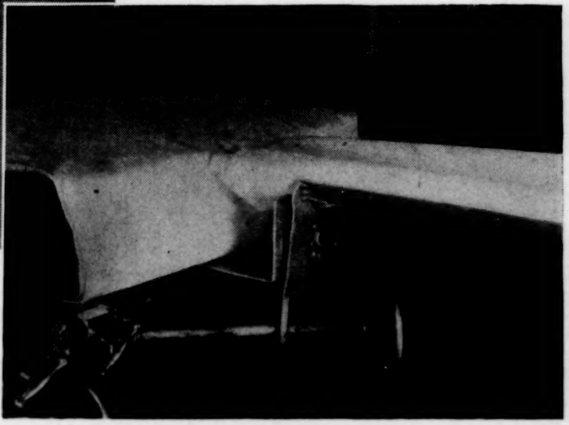
Below: Reversible armrest with ordinary mattress.





Left: Detached armrest adjustable to all positions.

Below: Reversible armrest with pilling mattress for continuous spinal anesthesia.



as part of his surgical team. In Chile nurses are going to be required to specialize in anesthesia and are handicapped by a lack of schools and instructors. Specialization and schools for training are likewise problems for nurses in Czechoslovakia and Palestine. In Switzerland and the Scandinavian countries the nurse anesthetist seems to be well established. In general, however, nurses wishing to specialize in anesthesia abroad could be given much needed help by the organized body of nurse anesthetists in the United States. (We asked one red-cheeked nurse from Glasgow how she was enjoying her first visit to this country. "It's all so different," she said. "You seem to know how to get so much more out of life than we do.")

From time to time various anesthetists have suggested that we run a question and answer column in the JOURNAL. The Publishing Committee has given this suggestion serious consideration and has concluded that the publishing of such a column is not feasible at the present time. However, if, after conscientious search, an association member cannot find the answer to a problem, she may write for help in finding the solution to Mrs. Eletta Engum Silver, Box 56B, Rt. 1, Union Grove, Wis.

FROM THE STATES.—[In the membership list, published as Part II of the JOURNAL, all officers of the state associations are listed.—Ed.]

Because of a present interest in loan funds—in Virginia a fund is being established to interest young graduate nurses in anesthesia, and in California a fund for disabled members has been proposed—a note from Hazel Blanchard, chairman of the Loan Fund Committee of the Pennsylvania association, is given in its entirety.

> At the annual meeting of the Pennsylvania State Association of Nurse Anesthetists, the following motion was passed: "That the Pennsylvania State Association of Nurse Anesthetists establish a Loan Fund to be known as the Hilda R. Salomon Loan Fund for the purpose of assisting members of the Pennsylvania State Association of Nurse Anesthetists who desire advanced education in the field of teaching in anesthesiology, and that $0.50 of the annual dues of each member be transferred to this fund."
>
> Recommendations made by the Loan Fund Committee and adopted by the members place control of the fund in the Pennsylvania State Association. It was also authorized that the Loan Fund Committee should determine the eligibility of the applicants and that the loans be granted on the basis of ability and general fitness for teaching. Each applicant granted a loan shall be required to give a promissory note with two endorsers who own property. It was agreed that the terms of the loan should be as follows:
>
> 1. That a person receiving a loan be allowed three years at which time one third of the entire amount shall be paid without interest;
> 2. That at the beginning of the fourth year interest on the remaining amount shall be 2 per cent;
> 3. That the entire loan shall be repaid within a period of five years.
>
> At the present time the money in this fund is limited, but beginning with Jan. 1, 1948, the Committee will be prepared to make loans to persons making written application to the Committee. Only two loans will be granted each year, the amount not to exceed $500 for each loan. Letters should be addressed to Miss Hazel Blanchard, Chairman, Loan Fund Committee, 25 Meade St., Wellsboro, Pa. The application furnished by the Committee must then be filled out and returned before a request can be taken under consideration.

The Western States Assembly of Nurse Anesthetists, composed of members from Oregon, Washington, and California, was organized on May 12 in Seattle, Wash. The anesthetists will have direct representation on the board of the Association of Western Hospitals. . . . A bill which would have prevented nurse anesthetists from giving intravenous anesthetics was introduced into the California Senate on Jan. 31. Through the efforts of Cleo Bopp, aided by California dentists, this bill has been amended to read that it does not apply to nurse anesthetists. . . . Agnes M. Lange, for ten years secretary-treasurer of the Indiana association, received a gift of $150 from the association as a token of their appreciation. . . . The Colorado nurse anesthetists plan to standardize their anesthesia records so that eventually all Colorado hospitals will use the same form. . . . In Washington a committee has been authorized to make contact with anesthetists and hospital executives throughout the state in a study of salaries and working conditions. . . . Association members in Houston, Tex., are planning bi-monthly social gatherings to which all present and potential members of the A.A.N.A. are invited. . . . Jessie Compton, president of the Texas association, asked new members to write their impression of the first state meeting they attended. Willie A. Little, St. Mary's Infirmary in Galveston, made this comment: "The older members of the A.A.N.A. stressed the fact that the younger members should take a vital interest in the Association and be willing to hold office when we are elected. It seemed to me that this was a very good point, as many of us are reluctant to accept leadership as we realize that a great deal of work and time go with the office." . . . To encourage students to write, the Alumnae Association of Grace Hospital School of Anesthesia in Detroit has a system of annual awards for the three best student theses. At the annual May meeting of the association, these theses are used as a basis for a panel discussion conducted by the senior class. . . . Mrs. Ruth Hodson Walker, a member of the California association, was killed on May 8, when the plane in which she and her husband were flying from Phoenix to Bakersfield, Calif., crashed. Mrs. Walker was a graduate of St. Luke's Hospital in Spokane, Wash., and of the Barnes Hospital School of Anesthesia in St. Louis.

From Katherine Gallagher's report on the Institute for Nurse Anesthetists in New Orleans, May 26-30: "Probably the two most interesting professional problems discussed were, first, the education of the nurse anesthetist and, second, the future of the nurse anesthetist. A suggestion . . . for university training for the nurse anesthetist, culminating in a Bachelor of Science degree, was enthusiastically received. The discussion of the medical and nurse anesthetist concluded in the recognition of each for his or her particular services . . . . There are only a few hundred anesthesiologists, and because of the extensive training required in this field of medicine, Dr. Adriani stated he believed it would be a number of years before a marked change would occur. . . . The success of the Institute was demonstrated by its large attendance [157]. The reasons for its success are attributed to the sponsorship of the American Hospital Association, under the direction of Dr. Hullerman, the splendid co-operation of Dr. Adriani, and last but far from least the Institute Committee, under the efficient chairmanship of Esther Myers Stephenson."

The next QUALIFYING EXAMINATION will be held Dec. 1, 1947. If possible, applications should reach the Executive Office by Sept. 15. Eligible applicants will be notified of the place of the examination at least three weeks prior to Dec. 1.

ABSTRACTS

ETSTEN, B., AND HIMWICH, H. E.: Stages and signs of pentothal anesthesia: Physiologic basis. Anesthesiology 7:536-548, Sept., 1946.

The pattern of pentothal anesthesia is the result of (1) a descending depression of cerebral oxidations starting with the cerebral hemispheres and extending to include the lower parts of the brain and (2) a specific effect on nerve function exerted in certain cerebral areas.

Pentothal is usually administered rapidly and in a strong concentration, and the earlier signs are telescoped and may be missed. The full gamut of signs of intravenous pentothal anesthesia is best seen when a dilute solution of the drug is given slowly. For this study the authors used a 1 per cent solution. Irrespective of the method of injection and concentration of the drug, the clinical signs remain constant for any given stage.

In the first stage, characterized by clouded consciousness, the functions of the cerebral cortex are moderately depressed. Environmental contact and performance of voluntary motor activities are impaired; euphoria is characteristic. The patient may still respond to questions, but the character of the answer reveals depression of cortical control. Fine discrimination is impeded; sensitivity to touch and pain are increased in the lowest part of this stage.

The second stage, characterized by hypersensitivity, begins with loss of consciousness, and the patient is no longer aware of his environment. The functions of the cerebral cortex are suppressed; the second layer which is the highest one functioning, is also slightly depressed, particularly with respect to hypothalamic activities and those of the subcortical motor nuclei. Consequently the excitement seen in the second stage of ether anesthesia is not observed. The thalamus is deprived of most of its modalities except that of pain; painful stimulus will elicit a hyperactive response exemplified by exaggerated and inappropriate movements of the arms and legs. These involuntary reactions subside immediately after the stimulus is withdrawn.

In the beginning of the first plane of stage three, light surgical anesthesia, the response to a painful stimulus becomes diminished. The application of a clamp to the skin evokes only a slight movement of an arm or leg. Consequently, minor operations may be performed. The cerebral hemispheres are suppressed, and the second phyletic layer, though still functional, is depressed more than in the second stage.

In the second plane, moderate surgical anesthesia, muscular response to a painful stimulus is abolished, but pupillary dilatation and respiratory changes are still evoked on application of a clamp to the skin. The suppression of the second phyletic layer accounts for the failure of somatic or muscular reactions to painful stimuli, and the midbrain, though somewhat depressed, acts as the highest remaining functional level. Persistence of pupillary and respiratory responses may be attributed to a midbrain pain center. When the patient is not stimulated, the pupils are constricted and do not react to light.

In the third plane, deep surgical anesthesia, the distinguishing signs are loss

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of pupillary and respiratory reactions to various stimuli, because the lowest pain center becomes increasingly depressed with the other midbrain mechanisms.

In the fourth stage, impending failure, all visible responses to pain have previously disappeared. Depth of narcosis is evaluated by pulmonary and cardiovascular function, the predominant signs being extreme respiratory depression and diminution of pulse pressure. Pupillary dilatation, often observed, may be ascribed in part to anoxia. Although the pons and medulla are not free from sensible metabolic inhibition, they are the highest active cerebral regions. This stage is a warning that further deepening of anesthesia will suppress vital centers and lead to dangerous fifth stage of medullary failure.

The size of the pupil gradually becomes smaller with increasing depth of anesthesia and is constricted in the second and third planes of the third stage. Absence of earlier dilatation may be attributed to depression of hypothalamic mechanisms, although the pupil may be dilated when anoxia supervenes. Pupillary reaction to light disappears in the second plane of the third stage. Dilatation with pain is absent in the third plane of the third stage, probably because of depression of the midbrain pain center. Eyeball movements become involuntary in the second stage, and slight activity is present in the first plane of the third stage. In the lower part of the second plane and in the third plane, the eyeballs become fixed and centrally placed. Loss of movement may be explained by a depression of the median longitudinal bundle and the nuclei of the third and fourth cranial nerves. Eyelid tone recedes with skeletal muscle tone.

The corneal reflex is more inconsistent than any other sign, perhaps because of its association with pain centers in three different phyletic layers. This reflex may disappear in the second stage or in the first and second planes of the third stage. It is not invariably absent, however, until the third plane, when the three top phyletic layers are obtunded.

Respiratory arrest may occur in any of the last three stages and therefore need not indicate the actual depth of anesthesia. Apnea in the upper levels of anesthesia is usually temporary but becomes prolonged in the later stages because the respiratory centers are deprived of metabolic support. Respiratory arrest in light anesthesia may be avoided by slow and gradual intravenous administration of pentothal, the pattern of breathing becoming more consistent with the degree of metabolic inhibition of the brain. An apparently normal respiratory rate and rhythm persist until the second plane of the third stage, when diminution of amplitude and increase in rate are observed.

Breathing, which becomes still more rapid and shallow in the third plane, may give rise to apnea, which is the usual occurrence in the fourth stage. In the second and third planes of the third stage and in the fourth stage, the pulmonary exchange is so depressed that arterial oxygen is reduced. Thus, in the deeper stages anoxic anoxia is added to the existing histotoxic anoxia and the brain labors under a double handicap.

Muscular responses to all kinds of pain are unchanged in the first stage but are hyperactive in the second when the second phyletic layer is dominant. All reflex movements become minimized in the first plane with depression

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*A Clinical Study of Carbon Dioxide Absorption During Anesthesia . . . Major Lloyd H. Mousel, Captains William A. Weiss and Luther A. Gilliom; Medical Corps, AUS . . . *Anesthesiology, Vol. 7, No. 4, pp 375-398, July 1946.*

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of the second layer. When the functions of this cerebral area are entirely suppressed, skeletal muscular reactions fail completely.

The pulse rate is altered by pentothal only when anoxia or carbon dioxide accumulation supervenes, and at that time the rate increases.

Blood pressure will often fall temporarily in the lighter stages of anesthesia, especially during rapid induction. There are often slight variations in the systolic and diastolic pressure, but a fall in pulse pressure is characteristic of the fourth stage.

Increases and decreases in deep tendon reflexes were elicited in various stages during pentothal anesthesia, discrepancies in the reflexes in the two sides of the body sometimes occurring. There was no positive correlation with the depth of anesthesia; these reflexes were occasionally hyperactive even in the fourth stage in some patients and were absent in the third stage in others.

FARSON, DEC. B.; CARR, C. J., AND KRANTZ, J. C., JR.: Anesthesia: The effect of cholesterol on pentothal and ether anesthesia. J. Pharmacol. & Exper. Therap. **89:**222-226, Mar., 1947.

"It is reasonable to assume that any compound which elicits a depression of the central nervous system would exert an additive effect or potentiation of the action of a general anesthetic. The mechanism of action of cholesterol in these studies may be explained on such a basis. Our observation on dogs and rabbits revealed depression produced by intraperitoneal and intravenous cholesterol injections. . . . We have succeeded in lengthening the period of pentothal anesthesia in the rabbit and dog by previous intravenous or intraperitoneal injections of cholesterol. We were unable to obtain a significant correlation between cholesterol-blood levels and the effect of this sterol upon anesthesia in the dog. Perhaps it is the concentration of cholesterol in the tissue of the central nervous system which is the dominating factor in its effect upon the anesthetic syndrome. In addition, cholesterol may exert an accelerating effect upon the absorption of ether from subcutaneous depots."

GOLDSTEIN, S. W.: Barbiturates: A blessing and a menace. J. Am. Pharm. A. **36:**5-14, Jan., 1947.

"The medicinal use of the barbiturates is chiefly for the depression of the central nervous system. Depending on the dose administered and the patient's reaction, the hypnotic effect can vary from a light sleep to a deep coma. . . . The average dose used to produce sleep does not depress the respiration, but large doses can cause death by respiratory failure. . . . It is apparent that addiction to barbiturates presents a problem. . . . Indeed it is fortunate that with most individuals there is a wide margin between the therapeutic dose and the toxic dose for the barbiturates usually prescribed for oral administration. Ten to fifteen times the therapeutic dose has generally proved fatal. . . . Nonfatal poisonings from as little as 5 gr. of bartital and 3 gr. of phenobarbital have also been reported. . . . Deaths caused by barbiturates are shown to be increasing in many states. . . . most of the barbiturates that are illegitimately and harmfully used get into the hands of the users through nonprofessional channels." There is "an urgent need for corrective uniform state legislation."

BOOK REVIEWS

Techniques and Procedures of Anesthesia. By John Adriani. 404 pages, 122 illustrations. Springfield, Ill.: Charles C Thomas, 1947. $6.00.

This book is an outline of technics. The subjects which are outlined cover a wide range. The major divisions of the book, general considerations, inhalation anesthesia, anesthesia by intravascular surgery, rectal anesthesia, regional anesthesia, resuscitation and inhalation therapy, give only a superficial idea of the vast amount of material outlined. It is obvious that so much material could be included only if mere enumeration was employed. This is the author's intent. Many of the outlines are presented in a two column arrangement, the first outlining the actual technic and the second noting the reasons for each step in the procedure. This is a method of teaching which has gained some popularity and certainly permits a wide coverage in relatively small space. There are many illustrations which add to the teaching value of the text.

An eight page table outlining the "selection of anesthesia according to operation in average cases" is included in an appendix. A second table outlines the "selection of anesthesia agent according to the complicating clinical conditions which may be present." A third table in the appendix gives the "general properties and characteristics of currently employed anesthetic drugs." Only eleven drugs are included: ether, vinethene, chloroform, ethyl chloride, paraldehyde, amylene hydrate, trichlorethanol, tribromethanol, ethylene, cyclopropane, and nitrous oxide. A fourth table gives the doses, in grains and milligrams, of morphine, scopolamine, and atropine for premedication. As is necessary in this style of writing, there is an extensive index which, however, will require some study as it is different from many indexes.

Childbirth without Fear. By Grandlty Dick Read. 259 pages. New York and London: Harper & Brothers, Publishers, 1944. $2.75.

This book is addressed to expectant mothers. It should be of interest to nurse anesthetists because it propounds a theory of childbirth which may well be correlated with the duties of the nurse anesthetist.

The author stresses the factor of normal childbirth in developing the thesis that such childbirth is possible without drugs and without fear. Years of study of the varying reactions of women before and during labor have led to the conclusion that normal labor and childbirth can be accomplished without pain. The greatest factor in the pain of childbirth is fear. In outlining the normal anatomy and physiology of pregnancy, the author lays a foundation for the review of the elements of pain and its relationship to fear. The subject of fear makes up several chapters which lead to the actual discussion of labor without pain or fear.

Chapter IX, "Anesthetics and analgesics," is not about these agents but, in line with the general subject, a dissertation on the needlessness of drugs during normal labor. "The best and safest anesthetic is an educated and controlled mind" is one statement which typifies the reasoning of the author. Education in pregnancy and labor are essential to the proper application of the theory, and a long chapter is devoted to a discussion of the plan of such education. The conduct of labor, after proper prenatal education of the mother, is the subject of two chapters. The importance of the obstetrician's attitude as well as that of the patient is stressed in the discussion of the actual labor.

A long chapter includes many records of cases in which labor has been conducted according to the author's theory. The concluding chapter is a plea for acceptance by medical men of the teachings presented and the recognition of the theory and practice of childbirth without fear.

PREOPERATIVE AND POSTOPERATIVE TREATMENT, 2nd edition. Edited by Lt. Col. Robert L. Mason and Harold A. Zintel. 584 pages, 157 illustrations. Philadelphia: W. B. Saunders Company, 1946. $7.00.

The first edition of this book was published in 1937. The many changes in surgery which have occurred since that time made it necessary to rewrite nearly every chapter in the book. New chapters have been added. Contributing authors have written the chapters dealing with the subjects covering their special interests. Sidney C. Wiggin has contributed the chapter on anesthesia. In this chapter the subject of anesthesia in relation to preoperative and postoperative care is discussed in detail, and 27 illustrations supplement the text. Throughout other chapters there are references to anesthesia and its relation to special subjects. Subjects such as shock, water balance, blood transfusion, and postoperative complications, which may especially interest anesthetists, are considered in other chapters. In an appendix there are tables outlining the laboratory findings in the blood and urine in health and disease. The book is well indexed and should be of interest to anesthetists.

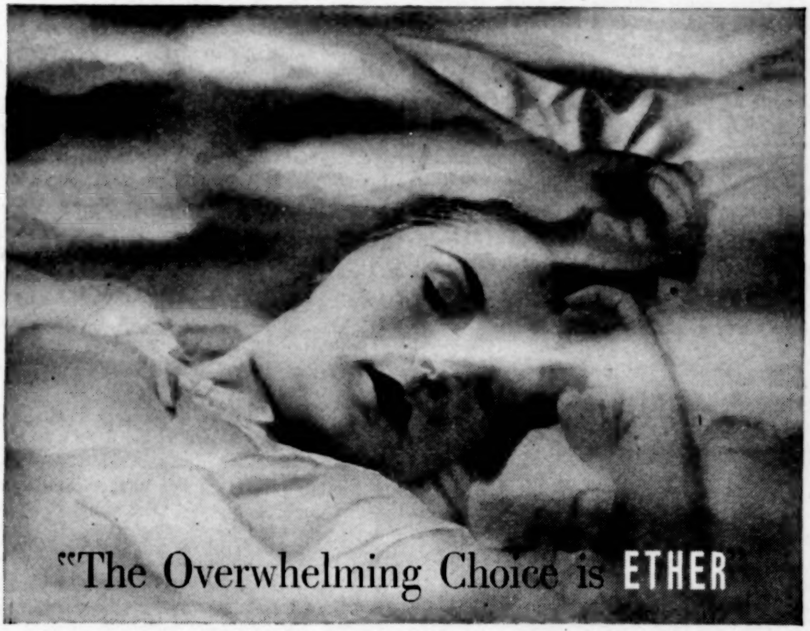
ANESTHESIA FOR NEUROSURGERY

(Continued from page 133)

tion is immediately followed by the administration of fluids and plasma or blood. Metrazol is effective in some cases of respiratory depression, particularly during the coma of pentothal sodium anesthesia. In most cases administration of intravenous fluids is started at the time of induction to provide sufficient fluids and a means for introduction of plasma or blood if needed. The intratracheal tube is a great help if artificial respiration becomes necessary, but prolonged pressure upon the breathing bag increases intrathoracic pressure and venous pressure and may add to the difficulties of the operation.

SUMMARY

Special problems in neurosurgical anesthesia have been outlined. A better understanding of some of the problems, such as maintaining the airway, avoidance of coughing and straining, proper position of the patient, selection of the anesthetic, dangers of the cautery, and an accurate report on the patient's condition, has resulted in greater ease in surgery and a lowered mortality and morbidity.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*Burgoyne, J. R.: Surgery of the mouth and jaws, Dent. Items of Interest, 68: 479-89 (May) 1946.

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WANTED: Nurse anesthetists for general hospital. No obstetrics. Apply: Superintendent, Presbyterian Hospital, 230 Lothrop St., Pittsburgh 13, Pa.

NURSE ANESTHETIST WANTED for 213 bed general hospital to give inhalation and intravenous anesthesia and to take care of the equipment. State experience, references, and salary expected in the first letter. Reply to Box 100, Journal of American Association of Nurse Anesthetists, 18 E. Division St., Chicago 10, Ill.

WANTED: NURSE ANESTHETIST for 220 bed approved general hospital. Salary open, full maintenance. Apply: Administrator, Harrisburg Polyclinic Hospital, Harrisburg, Pa.

WANTED: NURSE ANESTHETIST. Southern town, 50,000 population; home of University of Alabama; 137 beds; salary $200; full maintenance. Apply to D. O. McClusky, Administrator, Druid City Hospital, Tuscaloosa, Ala.

WANTED: Experienced nurse anesthetists for a large Midwestern private hospital. Apply: Box 222, Journal of the American Association of Nurse Anesthetists, 18 E. Division St., Chicago 10, Ill.

WANTED—NURSE ANESTHETIST: To increase anesthesia staff directed by medical anesthetist; 300 bed hospital. All types of anesthesia technics and agents employed. Salary open, depending upon experience. Full maintenance or allowance for living out. Write: Francis J. Audin, M.D., The Lankenau Hospital, Philadelphia, Pa.

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WANTED: Anesthetist for general hospital. Attractive salary. For full details write: Superintendent, York County Hospital, Rock Hill, S. C.

WANTED: Anesthetist for 100 bed general hospital. Apply: St. Francis Hospital, Kewanee, Ill.

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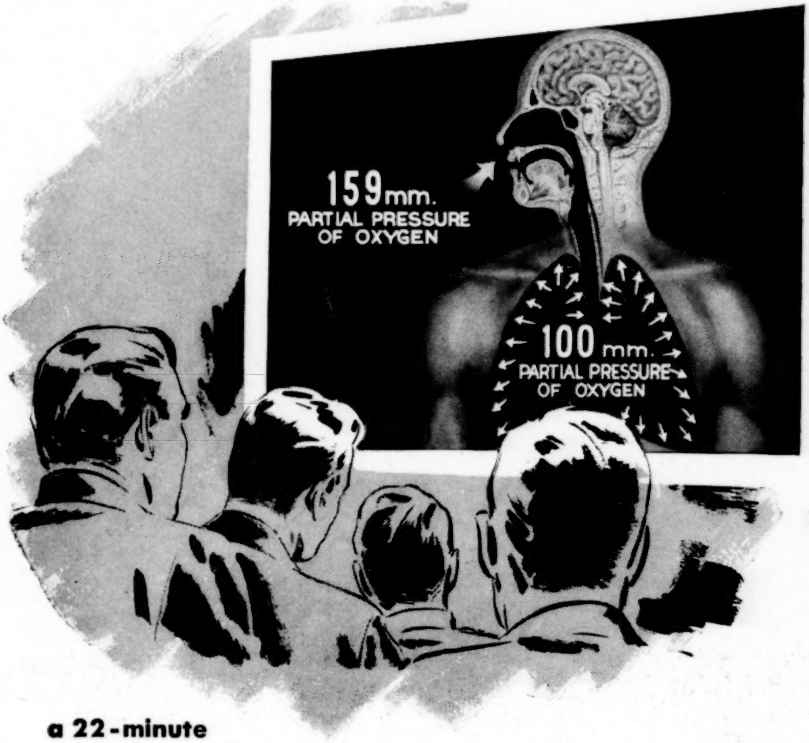

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